TECHNOLOGY DEPARTMENT

CHEMICAL AGE

VOL LVIII 21 FEBRUARY 1948 No 1493

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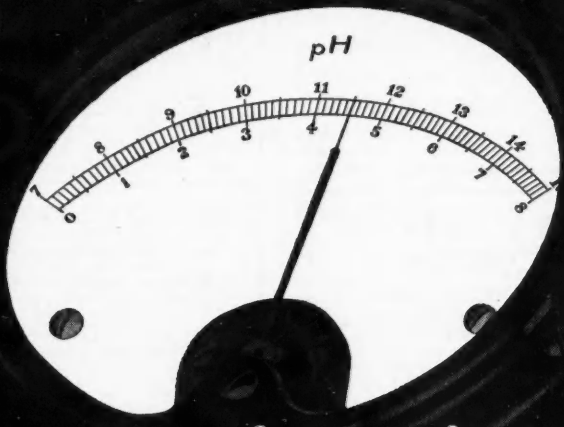

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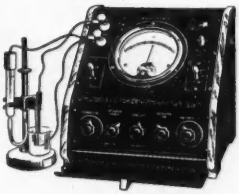

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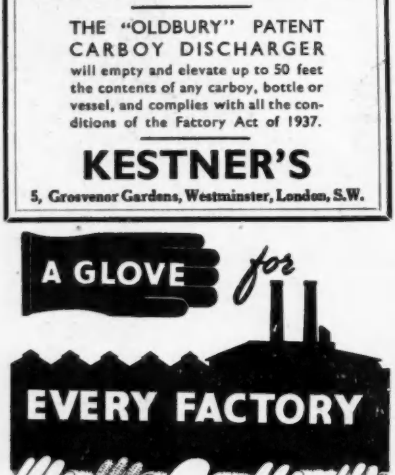

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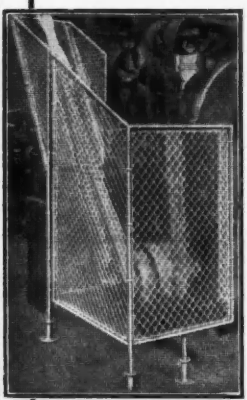

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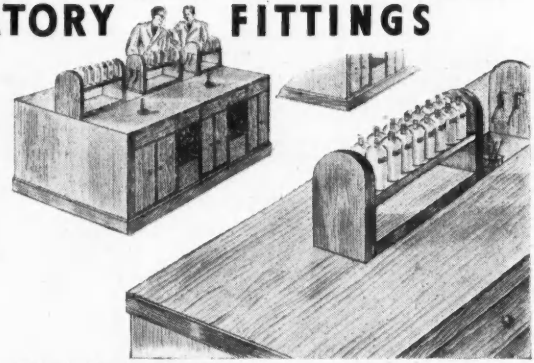

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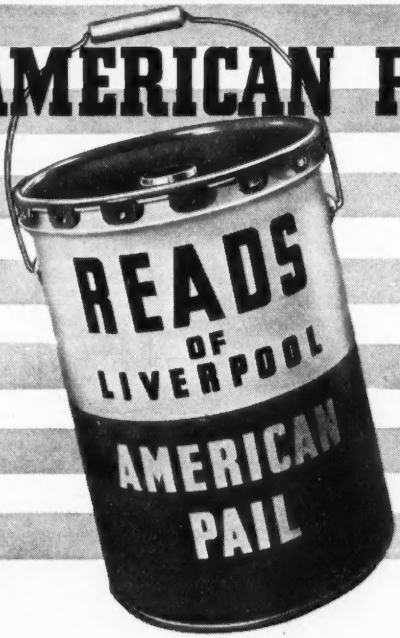

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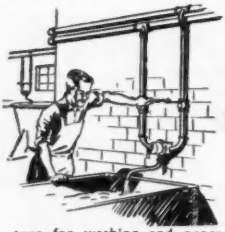

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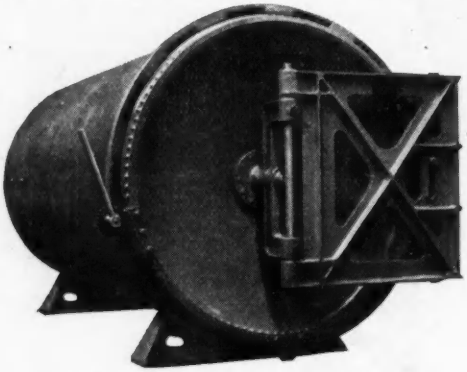

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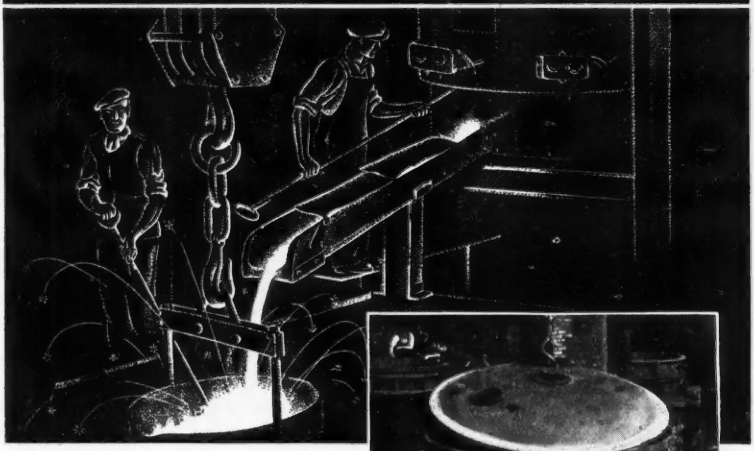

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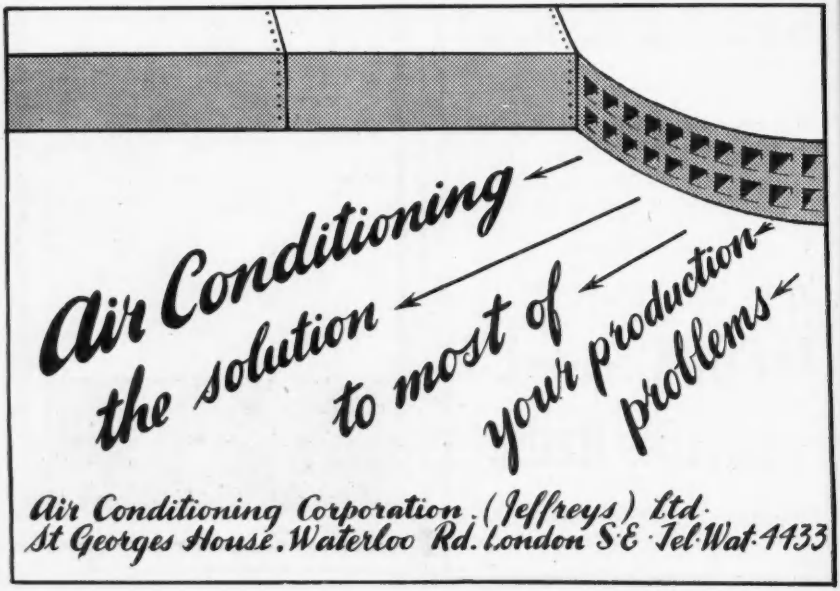

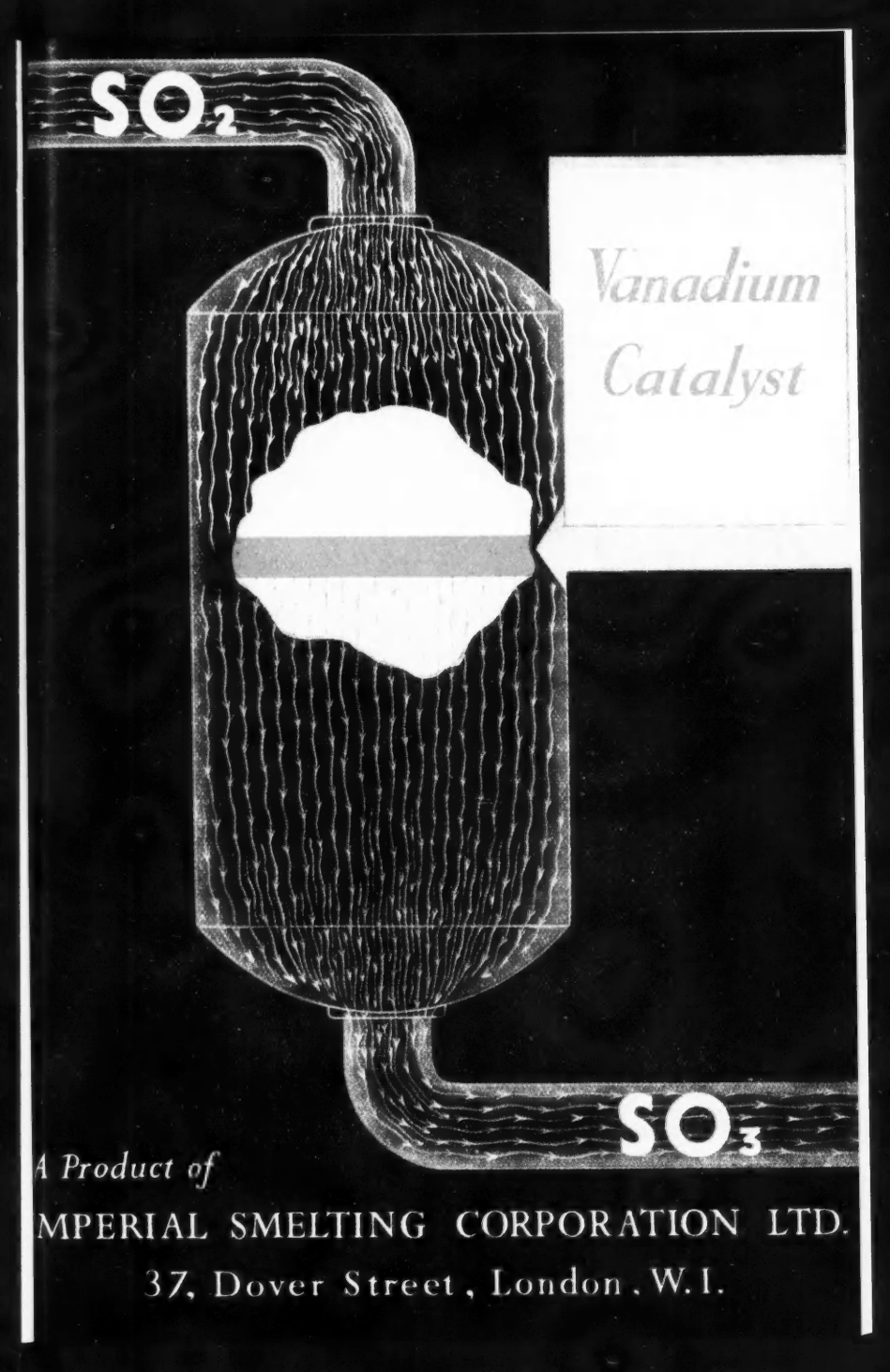

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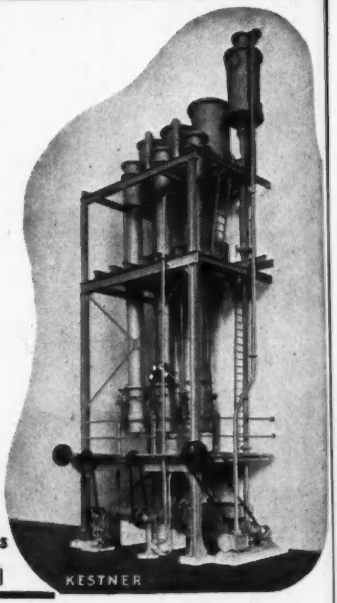

Kestner's Chemical Engineers

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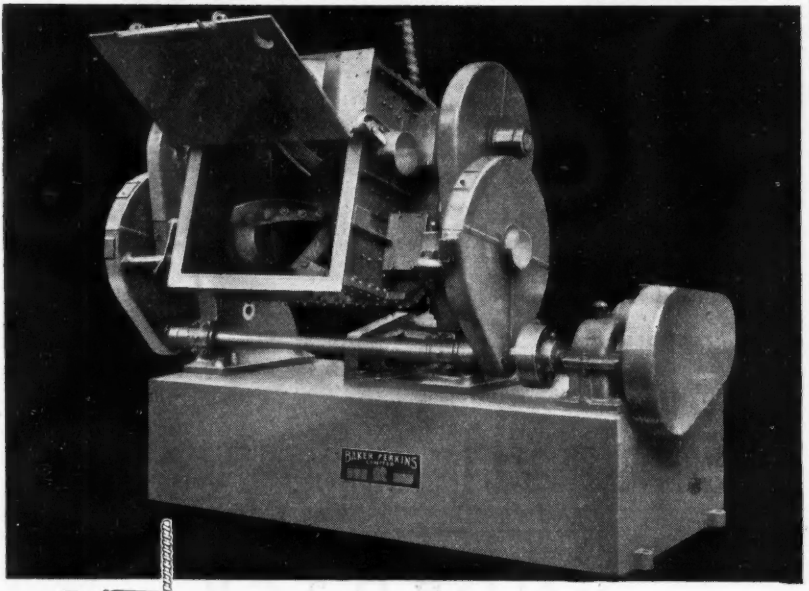

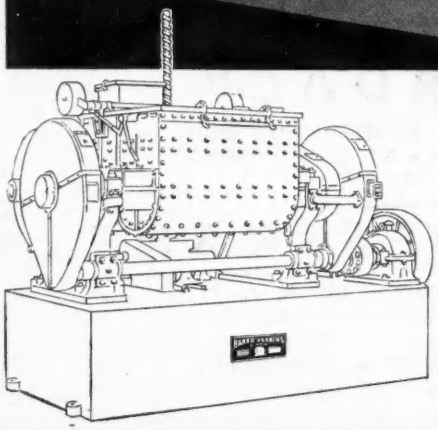

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The Chemist as Conservator

WHAT has been the effect of the two major wars of this century on the availability of materials, and on the world store of materials? About a century ago Crookes made his well-known prophecy that the nations of the world could not continue to increase in population without meeting disaster through insufficient food. The chemist, through his work on fertilisers and through the production of synthetic ammonia and nitrates, met Crooke's challenge and there is at the moment no immediate danger of that disaster. Recent events have shown, however, that we are living too close to the starvation line; it has not taken very much to bring large parts of the world down to short commons.

A warning that not in food but in raw materials of every kind are we overdrawing on the Bank of Nature has been given by Dr. C. M. A. Stine. In war or peace, he says, our planet grows no bigger. But its human population is growing at the rate of 200 million persons every ten years. That is to say we have about 20 million people more in the world to-day than we had one year ago. There are 140 million more people to be fed, clothed and housed than when World War II started. Every decade we are adding a population equivalent to that—while adding scarcely a single new acre of ground, or new ore deposit. On this score alone, inexorably, the human race must produce ever more and more, out of less and less.

To enable that to be done is the task of the chemist. We are not now dependent upon nature to the extent that once we were. Less than two centuries ago we could make nothing that was not derived directly from some natural product. Coal—to take one example—was just a fuel to be used for the production of heat. To-day, coal is regarded as a storehouse of chemicals—the basic building material of nature. Once that fact was recognised, chemistry enabled industrial techniques to be developed for its utilisation in that rôle. Soon the influence of coal began to affect the growing of indigo in India, of roses in Persia, of hogs in Mongolia, of silkworms in Japan, and of rubber in Malaya. Dr. Stine visualises a time, " a few generations hence " when the use of coal as a fuel may be prohibited as criminally wasteful. That will be because the chemist will have brought a new conception into industry.

To-day, it is considered as a hall-mark of efficiency if we burn coal so as to get 80 or 90 per cent of its energy into the form of steam or other type of useful heat. What will future generations say of us and our immediate ancestors if we destroy by burning them—whether with low or high thermal efficiency—those vast stores of carbon upon which they may rely for much?

Dr. Stine therefore regards the future of technological chemistry as lying in the field of synthesis. With comparatively few elements each of which is readily available, mainly carbon, hydrogen, oxygen and nitrogen, it is theoretically possible to create thousands of new materials showing the widest variations in their properties and hence in their applications. The task of the chemist will be to arrange those ele-

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ments into the most fruitful combinations, and at reasonable cost. We cannot replace natural raw materials, once they have been used up. That applies not only to coal, but equally to deposits of iron ore, copper, metals and minerals of every sort. We may be able to work deeper deposits, but it does not seem very likely that there will be deposits of some of these materials in sufficiently rich concentration below the sedimentary rocks.

Oil, now one of our promising chemical raw materials, is now in many places nearing exhaustion. The nineteenth century wasted natural gas with a prodigality that seems astonishing and criminal even to our generation. Now we are using it for chemical production. It was not until the superabundant forests of the primæval world began to show signs of exhaustion that we began to conserve our remaining supplies of timber and even now in many parts of the world there is far too little done to preserve and use it to good effect. The chief of the U.S.A. Soil Conservation Service estimates that in that country alone there has been lost 282 million acres of good and fertile land, by inefficiency and carelessness.

The chemist, aided by the chemical engineer and other scientific workers, must look to the future and study how to use existing waste materials. Why, for example, is only one-third of the wood in a tree now convertible into usable products? Why should not the provision of technical assistance be a common service available to everyone who has a waste material for which there is no apparent use? Such a service should not be confined to this country, it should be world-wide, for it is in the less highly industrialised lands that the greatest waste occurs.

All this, of course, inevitably introduces another factor, the provision of chemists and places in which they can work. Education, building, finance—all these enter into the problem, and it cannot be solved at once. Nevertheless, looking to the future, a future in which our immediate difficulties arising from the war have been overcome, may we not conclude that this war has at least made us keenly alive to what will be our major world problems in 50 or 100 years' time, and to the direction in which industrial chemistry must move during the intervening decades?

NO ILLUSIONS

PROFESSOR D. L. Savory, M.P., in an address at the Society of Individualists' lunch at the Connaught Rooms, London, last week, said that as one of the representatives of Ulster in the Imperial Parliament, he would like to point out that the intelligent people of that Province were not taken in by the specious promises made at the last election. The people of Ulster possessed a rugged individualism and had always realised that the nationalisation fetish would stifle the private enterprise on which the whole economy and prosperity of Ulster was based.

Neither Mr. Harland nor his partner, Mr. Wolff, waited for directions from Whitehall before establishing the world's largest shipyard in Belfast, which to-day held the record for output. Nor did Mr. Dunlop wait for inspiration of some petty dictator before inventing the pneumatic tyre.

NOTES AND COMMENTS

Elusive Target

THE tacit recognition that the chemical export totals planned by Sir Stafford Cripps in September last year are not likely to be reached has now received official confirmation in the latest figures provided by the Board of Trade. The Board has for some time been studying the progress of all industries towards the goals set last autumn—before restriction of capital expenditure and the closer control of manpower had been mentioned. That the results in most spheres of production have been considerably better than the circumstances might have warranted in no way disguises the unpalatable fact that in very few industries do the targets look like being reached before this year has run half its course. The latest evidence comes this week in the form of a comparison of monthly rates of export scaled to the level of prices in the last quarter of 1946. The monthly export target for chemicals on this basis is £3.75 million and the level reached in the last quarter of 1946 was £3.14 million. What happened after that is reflected by the adjusted results for the third and fourth quarters of the year just ended—of £3.04 and £2.68 million respectively. According to this overseas trading by the chemical industry in October-December, 1947, fell short of the planned monthly export by more than £1 million. Very much the same may be said of the pharmaceutical and drugs and dyestuffs industries, and paints, pigments and varnishes are in fact the only group to have shown consistently improved figures, having exceeded by £20,000 monthly at the end of 1947 the £500,000 target sought by the middle of this year.

Leadership

IN the conspicuous absence of effective leadership in current national affairs the value of individuals possessing qualities of the order of Sir Edward Appleton's is magnified a hundredfold. The eulogy is inspired by the full-length study which Sir Edward Appleton gave last week at the Royal Technical College, Glasgow, of the service of science to industry, which brought to mind once more the benefits of having among us a clear, far ranging and vigorous mind, for placing fundamental things in their proper relationship. That more than all else is the prerequisite to any ordered progress in the current environment of threats and promises. To Sir Edward Appleton, happily, the path ahead for science and industry in their intimate and sometimes conflicting relationship is clear and his certainty of how the causes of both will best be served is refreshing.

More Scope for Research

"FOR my own part," he says, "I believe that the first task of any country which desires to develop science as an aid to industrial progress is to foster fundamental research in its universities and technical colleges, for it is usually there that the really revolutionary industrial advances have their origin." His own Department of Scientific and Industrial Research fortunately is empowered to aid such fundamental work financially and in other ways, which we take to be a fairly certain assurance that some most deserving investigations will have the support which is their right but not invariably their guerdon. Next in importance Sir Ernest Appleton places the industrial research associations, of which the DSIR is also the patron, and he noted with evident satisfaction the changed spirit which has prevailed since the war, the diminution of suspicion which in the past kept nearly all firms in the same industry at arm's length and frustrated the kind of national collaboration of groups of manufacturers and of scientists which is now so imperative. Whatever he and the DSIR can do to strengthen that kind of liaison will evidently not be neglected. The assurance that this and full support of the responsible scientist to industry are focal points of DSIR policy augurs well for the future expansion of production on the lines urged by Sir Henry Tizard and for widened scope for scientific workers in all spheres.

State Pharmacology

SOME political groups here must be watching with keen, and possibly emulative, interest what is now taking place in Sweden, whose administration was reported this week to be coming to a decision expected to result in the control

(*Contd. overleaf*)

FLAX WASTE FOR TINPLATE POLISHING

IMPORTANT work recently undertaken by the Chemical Research Laboratory of the DSIR has been directed towards finding a suitable substitute for wheat offals, a material possessing just the right qualities of smoothness and oil-absorbency required for the final stages of tinplate manufacture. The wheat product has a food value for cattle, and is required for that purpose.

One of the materials considered by the Laboratory, and subsequently tested and found to be satisfactory; is "shives," a waste material produced in the retting of flax. The results of this research, says the *Board of Trade Journal*, have been conveyed to the Tin Research Institute for further experiments and use in industry.

Fuller information on the scientific aspects of this subject can be obtained from Dr. W. H. J. Vernon, Chemical Research Laboratory, Teddington, Middlesex, or from the Tin Research Institute, Perivale, Greenford.

NEW FOOD PRESERVATIVE

ACCORDING to investigations by the Tennessee Eastman Corporation of Kingsport, Tennessee, U.S.A., hydroquinone is perhaps the most satisfactory anti-oxidant for the prevention of rancidity in edible marine oils. In coming to this conclusion, says the company, it was influenced by the results of toxicity studies of a highly purified hydroquinone conducted at one of the leading U.S. universities for nearly two years. It adds there is every indication that this hydroquinone will be safe for incorporation in edible products. It is expected that official approval will be given.

RECOGNITION OF TEXTILE TECHNOLOGISTS

THE Council of the Textile Institute has passed a resolution expressing concern at the continued failure of Government departments to recognise the qualifications of technical technologists. The council has learned that the scientific and technical staffs of Ministries are being divided into pools of qualified men, but that although scientists, engineers and chemists are among the categories, no provision is made for textile technologists. The Central Register also does not recognise the profession of textile technology. The Institute's council has placed on record its surprise and regret and is to invite the departments concerned to recognise forthwith the status and qualifications of the textile technologist.

NEW MICROFILM READER

DEVELOPED to meet the requirements of the International Federation of Documentation, a new microfilm reader will be displayed for the first time to home and overseas buyers at the Engineering and Industrial Equipment (Home and Export) Exhibition which will be held at the Royal Horticultural Hall, Vincent Square, London, S.W.1, from March 10 to March 24. The reader is a self-contained viewing apparatus for examining microfilm negatives or positives in rolls up to 100 ft. in length, and in both 35- and 16-millimetre sizes.

Microfilming is now being widely used by firms engaged in the export trade. Microfilmed particulars of invoices, drawings, technical data and other information can now be sent by air mail at ordinary letter rate. This eliminates the necessity to despatch bundles of documents by air freight.

STATE PHARMACOLOGY

by the State of all pharmaceutical undertakings. For those to whom the acquisition by the State of all the chief means of production and distribution without reference to the past or much thought of the future, is an undisguised objective that might well seem like Utopia in our time and a desirable goal of similar efforts in this country. No such parallel can in fact be drawn, for reasons made clear by Dr. I. Michaels in the able and informed survey of pharmaceutical education and practice in Scandinavia which he gave last week under the auspices of the Pharmaceutical Society of Great Britain. In Sweden and Scandinavia as a whole most initiative in pharmaceutical developments has been provided by the State, based on long and intimate participation in economic and industrial affairs. The results were excellent. High standards in pharmacy have been set and rigidly supervised and, as the number of pharmacies is very limited, competition for individual advancement is keen. The structure corresponds very well with the geographical and social conditions in Sweden, but by no stretch of the imagination can it be made to fit conditions in this country. One of its principles, however, might well be studied here; that is the system of "district pharmacies" whose function is to supply neighbouring smaller undertakings with preparations which are most economically produced on a large scale.

W. J. Bush Share Issue

£375,000 More Capital

IN a letter to shareholders, the directors of W. J. Bush & Co., Ltd., manufacturers of chemicals and pharmaceuticals, drugs, food colourings, essences and essential oils since 1851, state that owing to the magnitude of the company's operations, the large stock which it is now compelled to carry, and the labour force it has now to employ, the use of more substantial working capital is involved. It has therefore been found necessary to ask for the provision of additional working capital by the creation of 375,000 preference shares of £1 each to rank in all respects *pari passu* with the existing shares.

More Preference Shares

It is also proposed to sub-divide existing preference shares (25,000 at £5 each) into shares at £1 each. The share capital of the company will then consist of 500,000 preference shares of £1 each and 250,000 ordinary shares of £1 each.

These and related resolutions will be discussed at an extraordinary general meeting to be held at Winchester House, Old Broad Street, E.C.2, on March 11. Subject to approval of these measures, say the directors, existing shareholders will be given the right to subscribe for the new shares at 23s. 6d. per share, while ordinary shareholders will be allowed to apply for preference shares not applied for by preference shareholders.

After the issue has been made the directors are satisfied that the company will have sufficient working capital for its present needs.

STEELWORK DECONTROLLED

THE Ministry of Supply announces new and secondhand constructional steelwork, such as roof trusses, stanchions and compound girders, has been released from acquisition control, under the Control of Iron and Steel (No. 62) Order, 1948. This Order came into operation on January 28. In the case of new constructional steelwork, the change is largely a technical one, as the structural engineer will still require an authorisation from his customer to acquire the controlled plain steel needed for fabricating into constructional steelwork (or to replace material taken from his stock for that purpose), and to authorise him to use the plain steel. The procedure for obtaining the authorisation remains the same.

U.K. Chemicals for Argentina

Principal Basis of New Trade Pact

WITH the exception of 10,000 tons of farm machinery and tools, the entire range of goods which Britain is to send to Argentina under the trade agreement signed in Buenos Aires last week, will be products of the chemical or metal industries, *i.e.*, coal (1 million tons), chemicals (50,000 tons), steel (75,000 tons), tinplate (34,000 tons), oil (16,179,000 barrels), and asbestos (1000 tons).

The schedule of manufactures to be supplied to the Argentine includes :—

2,585,160 cubic metres of petroleum products, which includes 1,785,000 cubic metres of fuel oil, 11,400 cubic metres of aviation petrol, 272,100 cubic metres of petrol, 8,380 cubic metres of paraffin, 6,680 cubic metres of gas oil, 36,200 cubic metres of Diesel oil, 13,000 cubic metres of lubricating oil and 452,400 cubic metres of raw petroleum;

16,500 tons of caustic soda (and certain quantities of other chemical products not yet announced).

1,000,000 tons of coal;

75,000 tons of finished and semi-finished steel;

2,300 tons of steel panels for bridges;

34,000 tons of tinplate (of this quantity up to 26,000 tons must be used for canning food for Britain);

2,000 tons of zinc sheets;

1,000 tons of tin;

1,000 tons of finished and semi-finished lead;

1,000 tons of asbestos;

10,000 tons of agricultural machinery and implements;

100 tons of cutlery; 50 tons of rustless steel.

AMERICAN PATENT REVOKED

MR. Justice Romer gave judgment in the Chancery Division last week in favour of John Summers & Sons, Ltd., large-scale manufacturers of steel strip and sheet, of Harwarden Bridge Steel Works, Shotton, near Chester, and ordered that a patent claimed by the Cold Metal Process Co., of Youngstown, Ohio, U.S.A., the defendants in the action, should be revoked.

John Summers & Sons, the plaintiffs, pleaded that the American company had, without justification, represented the plaintiff's manufacture was an infringement of patent and had threatened proceedings against the Ministry of Supply or plaintiffs. The company also contended that the Cold Metal Process Company's letters patent were invalid and ought to be revoked on the ground that the invention was not new, having regard to common general knowledge of those concerned in working rolling mills. The judge granted John Summers & Sons an injunction to restrain the Cold Metal Process Company from threatening any persons with an action for infringement of patent in respect of any process or machinery operated by John Summers.

FATAL EXPLOSION INVESTIGATED

Official Report Indicates Steam Valve Failure

EVIDENCE deserving the attention of all chemical users of pressure steam vessels is contained in the official report just published by H.M. Stationery Office of the circumstances associated with the explosion on June 24, 1947, in a steam jacketed pan at the works at Stratford, London, E.15, of A. Boake, Roberts & Co., Ltd. A process worker, Mr. J. G. Taylor, was fatally injured.

The "Report of Preliminary Inquiry (No. 3323)" made under the authority of the Boiler Explosions Acts, 1882 and 1890, represents principally the conclusions of Mr. W. A. Vose, of the Ministry of Transport Surveyors' Office who provided first a detailed technical description of the 26 in. diameter pan of 17 LSG metal sheet jacketed in copper 5/64 in. in thickness. He continues that the makers of the pan, which the owners stated had been purchased second-hand, in excellent condition, in 1939, were not known.

Insurance Test

The report goes on to describe certain repairs made before the pan was put into use in March, 1947, and notes that it was inspected and hydraulically tested to a pressure of 20 lb. p.s.i. by an inspector of the Eagle Star Insurance Co., Ltd., on April 30, 1947.

Other passages in the official's report are as follow:—

"The explosion was of a comparatively violent nature. The pan failed at the riveted connection to the jacket, the pan being torn away from the "L" ring over a circumferential length of about 40 ins. Steam was thus allowed to escape and the distortion of the pan caused by the explosion ejected a part of the contents of the pan. The cause of the explosion was over pressure.

Steam for the jacket was taken, via the steam main of progressively reduced bore, from the Lancashire boilers of 120 lb. p.s.i. working pressure. The steam had about 100° F. superheat leaving the boilers but was wet at entry to the pan.

Readings taken subsequent to the explosion showed that with a boiler pressure of 120 lb. p.s.i., which condition obtained at the time of the explosion, the pressure in the steam main adjacent to the stop valve for the pan was about 107 lb. p.s.i. The pan was in direct connection with the boilers, there being no reducing valve fitted. The relief valve fitted to the pan was ¾ in. in diameter, the valve lid being of the flat-faced four wing type. The valve spring was of steel ¾ in. mean diameter, ¼ in. square section, 2¼ in. in length with eight free coils. The spring was compressed by a compression screw through the top of the valve case and the compression screw was secured by a lock nut. The valve was set with a spring compression of 5/64 inch.

At the time of my inspection I was informed that tests as follows had been made:—The relief valve was tested under hydraulic pressure, when it was found that the valve failed to lift at any pressure up to and including 50 lb. p.s.i. The pressure gauge was tested under hydraulic pressure, and with a pressure of 20 lb. p.s.i. on the standard gauge the pressure registered by the gauge under test crept to 11.75 lb. and to 15 lb. p.s.i. after the gauge had been repeatedly tapped.

I carried out further tests on these fittings. First the relief valve was tested under steam and found inoperative at any steam pressure up to and including 50 lb. p.s.i. The valve was then tested under hydraulic pressure when it lifted at a pressure of about 70 lb. p.s.i. The valve was next taken adrift by unscrewing the valve casing, without disturbance of the compression screw, was wiped clean and re-assembled. It was then retested under steam and lifted at 26 lb. p.s.i.

The pan pressure gauge was tested under steam but no reading beyond 2 lb. could be obtained. The gauge was dismantled and examined when it was found that its condition was attributable to tightness in the working parts. Slight working of the gauge by hand was sufficient to free the mechanism.

That a pressure of 70 lb. p.s.i. was necessary to lift the relief valve and this under hydraulic and not steam pressure conditions, also that subsequent to re-assembly the valve lifted at 26 lb. steam pressure indicated that the valve lid had not been free in the bore of the seat. Inspection of the valve verified this.

There was no excessive deposit on the valve but the wing clearance was exceedingly fine and the imprints of the wings were indelibly marked in the bore of the valve seating. The condition of the relief valve was such that the pan could have been subjected to a steam pressure of at least 70 lb. p.s.i. without operation of the relief valve. It was stated that at the time of installation of the pan the relief valve was set by the fitter to lift at 10 lb. pressure. When consideration is given, however, to the small amount of compression necessary for a loading of 10 lb. with this valve it is easy to see that some small amount of additional compression may have been given inadvertently when, for instance, the locking nut was tightened.

Under the conditions of operation of the pan as described (by another worker) it was possible for steam pressure to build up in the pan without this being known until the pan was next visited. In addition the relief valve, which could have served as a warning of overpressure, was inoperative at its intended working pressure.

The evidence shows that the pan had been worked at pressures in excess of 10 lb. p.s.i. What actual pressure obtained in the jacket at the time of the explosion is a matter of conjecture.

I consider that in that period immediately prior to the explosion during which the pan was left unattended the pressure of steam in the jacket had gradually increased until a pressure obtained such as the pan could not be expected to withstand and failure was inevitable.

Essential Safeguards

In a footnote appended to the report the Engineer Surveyor-in-Chief states: In the interests of safety of the attendants it cannot be too strongly emphasised that, where low pressure steam plant is connected to a higher pressure steam line, it is essential that adequate means should be provided to ensure that the safe working pressure of the plant is not exceeded under service conditions.

Such means include, on the low pressure system, a suitable reducing valve, a relief valve of such type and size that it will, at least, give audible and visible warning in the event of an undue rise of pressure, and a pressure gauge.

It is, of course, necessary that these fittings should be maintained in working order. In the present case, no reducing valve was fitted, and examination after the explosion revealed that the relief valve and the pressure gauge were not in proper working order.

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ALKALI WORKS REPORTS

Infractions More Frequent in 1946

ANNUAL Report No. 83 on Alkali Works, 1946, by the Chief Inspectors for England and Scotland, has now been published by H.M.S.O. (1s.).

Among acknowledgments for assistance, are mentioned the Director of Fuel Research, the Director of the Geological Survey, and the Government Chemist; reference is also made to a tour of Germany, and comparisons (favouring U.K. methods) drawn between the regulations of the two countries.

3385 Works Visited

During the year under review, district inspectors paid 3385 visits and special visits by the chief inspectors numbered 106. There were 1033 works registered under the Act, involving the operation of 1913 processes.

The number of instances where infractions of the Act occurred—says the report—or where otherwise unsatisfactory conditions were reported was rather higher than before the war. In every case, suitable attention was given, and in no case was it considered necessary to institute legal proceedings.

The demand for chemical and allied products has been exceptional and in view of the importance of maintaining production—especially for export—it was considered right to exercise some discretion in the administration of the Act. Supply of structural material such as steel, timber and cement was limited and the labour position even more difficult. In these circumstances insistence on the strict observance of the law—for example, as in the provision of best practicable means as a preliminary to operation of a new plant—might have led to serious delay, and inevitable repercussions in other directions. For this reason it was not always possible to satisfy complaints. Similar considerations necessarily influenced the advice given in connection with complaints against unregistered works.

Unregistered Processes

As a result of complaints received directly, or from M.P.s or local authorities, 308 visits were made to unregistered processes. It is stressed, however, that the Department has no authority to impose conditions on such works, although it advises and makes recommendations where they are likely to reduce causes of complaint. Discharge of grit and smoke chiefly accounted for visits under this heading. In most cases the trouble had been caused by the use of unsuitable fuel.

In a metal-spraying works (zinc, lead, and sometimes plastics), it was discovered that an inefficient method had been adopted, resulting in much of the spray floating away as a fume. In such cases it was generally recommended that a bag filtration plant be installed.

Other works visited under this heading were engaged on pitch combustion, lime-burning, steel production (carburising, cementation, etc.), coke ovens, brake-linings, phosporous manufacture, wire enamelling, firelighters, magnesia and sodium metasilicate manufacture. Some problems were solved, while others are still being considered.

Particular attention was paid to the emission of fluorine, which was found to have been widely distributed as a minor constituent of such raw materials as coal, clay and ironstone. In some instances, remedies are suggested. Most methods are described as practicable though expensive; however, if really serious damage to livestock were reported the chief inspectors were prepared to devise control methods with the co-operation of the manufacturers.

Sulphuric Acid Works

The average acidity of the official escape tests at one works (chamber method)—2.97 grains as SO_3 per cu. ft.) was above normal. Individual escapes in excess of the statutory limit of 4 grains, as SO_3 per cu. ft., were recorded in 16 instances (table below). A second test at works where these infractions were found to exist—the time allowed to elapse varied from five hours to two months—revealed remarkable improvements in all instances.

SO_3 EMISSION AT 16 WORKS

1st test grains as SO_3 per c. foot	2nd test	Interval between tests	Reason for high test
12.0	1.6	5 hours	Insufficient chamber space.
60.0	2.8	2 months	Inexperienced operators.
9.0	2.3	6 hours	Shortage of nitre.
6.4	3.6	1 week	Irregularity of burner operation
8.8	1.3		
4.5	0.8	6 hours	Overloading.
19.0	0.5	1 day	Starting up too quickly.
5.3	0.5	3 days	Shortage of nitre.
6.0	0.6	6 hours	Feed to ammonia oxidation plant blocked.
7.7	2.3	13 days	Shortage of nitre.
7.0	0.5	6 days	Starting up.
5.9	2.4	3 weeks	Overloading in hot weather.
6.4	1.4	15 days	Inexperienced operator.
6.7	3.1	3 weeks	Overloading in hot weather.
7.4	1.6	1 day	Shortage of nitre.
5.1	3.2	1 hour	Overloading.

In works employing the contact method —and these are increasing in number says the report—escapes were normally substantially higher than in the chamber process. The average of official escape tests from contact processes was 3.11 grains SO_3 per cu. ft., compared with 2.07 from the chamber process. Soda scrubbing processes reduced the average from 3.11 to 1.2 grains.

After consultation with manufacturers and designers of plant, the National Sulphuric Acid Association has been informed that an acceptable escape corresponds to 98 per cent conversion of sulphur to sulphuric acid as the basis for observing the provisions of the Alkali Act, subject to an over-riding maximum of 4.0 grains per cu. ft. (undiluted). As in the case of chamber plants, exceptionally high escapes were found to coincide with overloading of plants.

Chemical Manure Works

As a result of increased demands for superphosphate, there was intensified operation at these works, and therefore less opportunity for cleaning and overhaul of the scrubbers. In consequence, escapes were occasionally of too high an acidity.

Improvements were brought about by better water supplies, plant extensions, improvements in scrubber packings and disposition of water sprays. In one case, elevators and conveyors were redesigned, and water gas scrubbers rendered more efficient by better arrangement of the water sprays.

An ammonium phosphate plant at one works was thought to have contributed to a general complaint, and experiments with dust-arrestment devices have been ordered.

Chlorine Works

Continued complaints necessitated the closure of two plants at one works. One of them, after reconstruction, was recommissioned in October. Chlorine loss has since been considerably reduced, both as the result of a new manufacturing technique and the installation of a new scrubbing system.

Inspection of an unregistered works in Kent, following the receipt of complaints, revealed the operation of a chlorine process. Means for dealing with chlorine escapes were specified, but the company had great difficulty in obtaining the necessary plant and other delays occurred due to labour troubles and unforeseen contingencies. By the end of the year, however, the plant was complete and awaiting trial. As soon as it has been proved to operate satisfactorily, registration will be granted.

Tar Distillation

The report says that it is hardly possible to operate a tar works without occasional cause for complaint, but such occasions are often found to have been due to circumstances that could and ought to have been prevented. It was frequently found that foul gas lines, disconnected owing to some temporary fault, had been left in that condition. Operation of a tar distillation plant having no provision for dealing properly with the incondensible gases constitutes a breach of the Alkali Act which cannot be permitted. Pipe lines have to be of adequate size to permit of the withdrawal of foul gas from the collecting boxes or coil end at all stages of the distillation, and in order to avoid escapes from collecting boxes, a means of draughting is needed. The pull should be neither too great nor too little, and an inclined draught gauge can be fitted without undue trouble.

Spoilbanks

Much time and attention was devoted to spoilbanks, and the consideration of means for controlling them. 290 visits were paid, generally in company with a Local Authority official because the Alkali Inspectors no longer possess any statutory powers in this connection. They made recommendations but were not in a position to undertake the regular "policing" that is required to ensure that preventive measures are not neglected. As a result it was often found that by the time attention was called to a spoilbank combustion had reached an advanced stage when it is difficult to secure control. Although a satisfactory improvement was effected in many cases, the rate of deterioration in others was greater and unless more vigorous efforts can be made, a further worsening of the position is to be anticipated.

I.C.I. Scottish Explosion

Five women workers were injured in an explosion which occurred at the Ardeer (Ayrshire) factory of Imperial Chemical Industries (Explosives Division) last week. An official statement said that the explosion occurred in a detonator packing house, where, for reasons unknown, a number of industrial electric detonators ignited. Damage was confined to the department where the blast occurred. Investigation has been started. Three of the injured were sent home after treatment, and the other two were removed to the Western Infirmary, Glasgow, with face and body injuries.

Factory Smoke Prevented.—A method by which smoke can be eliminated, and a 5-10 per cent saving in coal effected, has been devised for factory furnaces by the Fuel Research Station, Greenwich, S.E.10.

BETTER PROSPECTS FOR RESEARCH

DSIR Chief Foresees More Scope for Scientists

THE important changes which have occurred in favour of the pursuit and application to industry of scientific research were indicated by Sir Edward Appleton (Secretary of the Department of Scientific and Industrial Research) speaking last week at the Royal Technical College, Glasgow. The meeting, which more than 1000 representatives of all branches of science and industry attended, was arranged by the Scottish Council (Development and Industry) and associated with Sir Edward Appleton's inspection of the new research laboratories at East Kilbride, which he said were likely to be the best of their kind in Europe.

Sir Edward, surveying the bases on which all significant research to-day was founded, spoke appreciatively of what was being done by the co-operative research associations in industry and the increasing collaboration which was now evident.

Less Secrecy

The DSIR (he said) launched this co-operative research movement early in its history, and before the war the research associations, after an admittedly hard struggle, had established themselves as a permanent feature of British industry. This had come about in spite of the fact that the climate of the pre-war years was not very favourable to industrial research, and in spite of the fact that the spirit of competition throughout British industry in those years often made it highly suspicious of co-operative effort.

During and after the war this atmosphere has radically changed. The close contact between firms which were engaged on war work revealed that many long cherished secrets, which many firms believed were known only to themselves were not secrets at all, and that by and large most firms possessed much the same knowledge and were conscious of the same gaps in that knowledge.

So it has come to be widely recognised that close collaboration in research matters is very desirable and need not stifle healthy rivalry in the applications of its results. The result is that since the war there has been a remarkable expansion of the movement. Thirty-five industries now possess active research associations, some of them as in the case of the Iron and Steel and the Electrical Research Associations have incomes of the order of £250,000 a year, and all of them have incomes by which research can be satisfactorily prosecuted on a very substantial scale—perhaps three or four times the pre-war scale.

While it would be a short-sighted policy to drop longer range research entirely, nevertheless the present urgent need for doing everything possible to increase industrial efficiency has caused most of the associations to concentrate their main effort, for the time being, on shorter range work and on the dissemination of existing knowledge

Raised Output

As a means of achieving an immediate increase in productivity many of them have also engaged for some time in what was called during the war "operational research." In industry this means getting a quantitative estimate of how the efficiency of industrial operations depends on all sorts of factors. In other words the arithmetic of "what happens when we do what." In this way management can be provided with reliable data on which to base decisions relating to production.

Studies of this kind already made in some branches of industry have shown that in some cases industry can take immediate steps by which output could be increased by as much as 20 per cent.

Opposition to Innovations

Of course, there are many apparently valid reasons why no new ideas should ever be developed. Suppose, for example, a research department of a firm puts forward a new idea for a new gadget, perhaps a refrigerator working on a new principle, or for a new plastic or some other chemical, there would be plenty of people in the firm ready to point out quite properly that it may cost anything up to £100,000 to bring the idea up to the point where something can be sold. They will emphasise the manufacturing difficulties to be overcome and will ask what assurance there is that the article when produced can be sold in sufficient quantity to recover the development costs in a reasonable time. They will say that the staff requirements for the development work are all engaged in maintaining production.

All these objections may be valid, and it is quite proper that they should be raised, but the chances are that unless the research department has direct access to the management of the firm new ideas will be smothered at birth, so it is important, indeed very important, that if the firm employs scientists for creative research they should have access

(*Continued on page 265*)

The National Insurance Act

Legislative Effects Which Will Operate in July

WHEN the new scheme of sociology of the National Insurance Act, 1946 (an agreed measure founded on that of the Coalition Government) comes into full operation on July 5, practically everyone will be subject to compulsory insurance, although exemption will be available to persons whose income does not exceed £104 per annum. All the present schemes are incorporated in one scheme with one contribution coverfng all benefits

There are three classes of insured persons, *viz*: Class A (employed persons); Class B (self employed) being persons gainfully occupied but not under a contract of service; and Class C (non-employed) being persons not gainfully occupied in any way. Voluntary contributors under the present schemes who are employers, self employed, traders, persons on own account generally will mostly go into Class B, while others who receive salaries above the scale for present compulsory insurance will be included in Class A.

Contributions

These will be payable in one stamp. The full rate for Class A is 8s. 5d. for men 18 years and over, 6s. 7d. for women, 4s. 11d. for boys under 18 years, and 3s. 11d. for girls. The employer is responsible for the contribution, but can recover from the employee, 4s. 7d., 3s. 7d., 2s. 8d. and 2s. 2d. respectively. For Class B, the contribution for men 18 years and over is 6s. 2d., for women 5s. 1d., for boys under 18 years 3s. 7d., and for girls 3s. 1d.; for Class C the rates are 4s. 8d., 3s. 8d., 2s. 9d. and 2s. 3d. respectively.

Benefits

All benefits apply to Class A; all benefits except Unemployment Benefit to Class B only; Unemployment, Sickness and Maternity benefits do not apply to Class C. All classes are eligible for medical, hospital, dental, optical, nursing benefits, etc.

A useful point to note is that the chief rate for sickness benefit, unemployment benefit and retirement pension is the same, being 26s. per individual, plus for wife or other adult dependent (pensions, wife only) 16s. with 7s. 6d. for the eldest or only child (other children come under the Family Allowances scheme). For the pension, the wife secures the 16s. at any age if not gainfully occupied when the husband becomes eligible; the ordinary pensionable age is 60 for a woman, 65 for a man.

For sickness and unemployment benefits, 26 contributions must be paid since entry into the insurance scheme, with at least 50 credited in the contribution year (this runs from July to July) preceding the next benefit year (this runs from January to January); for totals less than 50, lower rates of benefit will apply. If 156 contributions have been paid, sickness benefit continues indefinitely, otherwise only 312 days' benefit is payable; requalification is established when a further thirteen contributions have been paid. This requalification rule also applies to unemployment benefit. Unemployment benefit is payable for 180 days, plus additional days according to the contribution history of the claimant, and other days' benefit may be granted by a local committee.

For retirement pensions—this also applies for widows' allowances; husbands' insurance of course—at least 156 contributions must have been paid, and there must be an annual contribution average of 50; averages of less than 50 would permit pensions at reduced rates.

Between the ages of 65 and 70 (women 60 and 65) a retirement pension is not payable until actual retirement takes place, although earnings up to 20s. per week still permit eligibility. For earnings above 20s., 1s. is deducted from the 26s. for each 1s. earned. At 70 (65 for women) the full rate of 26s. is payable irrespective of work or earnings. A point to note is that until 70, Class A and B pensioners who remain at work are eligible for sickness benefit.

Ten Years to Wait

If when entering insurance a man is 55 (a woman 50) or over, a retirement pension is not receivable until ten years' insurance is registered, but contributions can be paid after the age of 65 (women 60) to qualify, and this applies even though retirement has taken place (in this case rates are at Class C amounts). This means that everyone is required to be insured for at least ten years for pensions. In the case of currently insured persons, however, five years' insurance has to be paid with 104 contributions actually paid, but there must be a contribution average of 50 as with others; if the average is under 50 the pension is at reduced rates.

Persons already in receipt of a Contributary Old Age Pension, when the scheme starts, can continue to receive the present pension of 10s. (10s. wife), even though at work and with earnings of any amount; if the pensioner is 70, the new rates apply in any case.

U.S. Dyestuffs Shortage

Mill Operations Threatened

THE institution of export controls on certain U.S. coal-tar dyestuffs, crude and intermediate products, which at present are scarce, was recommended to the Office of International Trade of the Department of Commerce by the Silk and Rayon Dyers' and Printers' Association.

It is reported that the dyestuff shortage is threatening to curtail mill operations and the claim is made that this is due to the export of relatively large quantities of dyes.

Meanwhile, prices of two important intermediate products—*viz.*, aniline oil and beta-naphthol, have been increased on account of higher production costs. The price of the former rose by one cent to 14 cents per lb., the latter from 26 to 27½ cents per lb.

BETTER PROSPECTS FOR RESEARCH

(*Continued from page 263*)

to the management and that the management should make its decisions on whether a new idea is to be developed or not on the evidence presented.

Let me disabuse you now of any idea that the modern scientist is a scatterbrained person whose enthusiasm for what is new blinds him to hard facts. The whole aim of a scientific training is to inculcate independence of thought and to teach that action should be based on a balance of competing factors.

Some of you may say that as practical men you rely on experience. Well I for one would not be prepared to accept the epigram that "Experience is the name that we give to our mistakes." But every true scientist recognises that the knowledge gained from experience may have come from observations and experiments which satisfy all the criteria of scientific experiment, although since they were probably carried out by the expensive process of trial and error on a large scale many scientists would feel that they were able to devise experiments in their laboratories which would have given the same results more quickly and far more cheaply.

The scientist only fears experience when it clearly becomes prejudice or when it has led a man to believe that the existing state of affairs must be permanent in all circumstances. The standpoint of the modern scientist in approaching any industrial problem is that there is probably a better way of doing most things and that it is possible to obtain quantitative data by which one can judge with certainty whether the new technical method would be worth while.

U.S. Inorganic Chemicals

Record HNO_3 Output in November

ACCORDING to the Bureau of the Census, U.S. Department of Commerce, production of inorganic chemicals in the U.S.A. declined slightly in November compared with October because of fewer working days, but remained at a high level. A survey of 35 chemicals disclosed that 20 were produced in smaller volume in November than in October, 1947, but only nine were produced at a lower rate than in November, 1946.

Chemicals, whose production was less in November than in October, include the ammonia compounds, calcium phosphates, phosphoric acid, tetra sodium phosphate, chrome colours and chemicals, Glauber salt, chlorine, soda ash, caustic soda and sulphuric acid. Of these, only synthetic ammonium sulphate and the calcium phosphates were produced at a lower rate last November than in the previous November. Other chemicals whose current output is below last year include calcium carbide, chrome green, lead arsenate, silver nitrate and sodium bicarbonate.

The outstanding production increases registered were for hydrogen and nitric acid. Hydrogen production rose in November for the seventh consecutive month, and nitric acid output rose to a record level of almost 68,000 tons.

NORWAY GETS MORE COAL

REPORTS from Norway say that rapid progress has been made since the war with the reconstruction of the Norwegian coal mining installations in Spitsbergen. Coal output totalled last year 345,328 metric tons and production runs at present at 12,000 tons a week, an annul rate of some 600,000 tons and it is hoped to bring about a further increase. According to a speech to the Norwegian Geographic Society by Hr. G. Aasgaard, a mining engineer, Spitsbergen should be able to meet one-third of Norway's future coal requirements. Nor-Norway before the war handled some 3 million tons of coal shipments annually, of which about 300,000 tons came from Spitsbergen. "Spitsbergen coal is of such high grade that it is almost too good to burn. It can be utilised far more profitably for the manufacture of oil, coke and plastics," he emphasised. The speaker also pointed out that the temperature in the islands was increasing and that the glaciers were receding. Hitherto, coal only had been exploited, but there were also lead and zinc ores available and large quantities of gypsum.

FRENCH OILSEEDS INDUSTRY

Home Cultivation Aids Revival

FOR the oils and fats technologist France is associated with the name of Hippolyte Mège-Mouriès who invented margarine during the Franco-Prussian war and was awarded the prize that Napoleon III offered for a satisfactory butter substitute. It is also associated with P. Sabatier and his co-workers who noted some 50 years ago that many ethylenic organic compounds combined with hydrogen and formed the corresponding saturated derivatives; Sabatier is therefore regarded as the inventor of oil hydrogenation. The name of Chevreuil is usually associated with the early beginnings of the soap industry. In 1823—thirty-two years after Leblanc built the first French soda factory subsidised heavily by Philippe-Egalité—Chevreuil revealed in his "Recherches Chimiques" that fats are "ether-salts" composed of fatty acids and the "sweet principle," and he laid the foundation of the French oil industry, centred mainly around Marseille, Paris, Lyon and Bordeaux. The honour of having introduced another important process into the industry, namely, the solvent extraction of oil seeds, is usually attributed to another Frenchman, Deiss, who was granted British patent 390 on February 14, 1856, for the use of carbon bisulphide for this purpose.

Changing Supply

Though it is not surprising to find these developments taking place in the 19th century, which in Western Europe saw the chemical and allied industry as a whole taking root, one of the main reasons for the swift development of the oils and fats industry was the supply of home-grown oilseeds and the good market for presscakes, which were returned to the farmer. To-day the oil mills depend mainly on imported oilseed, yet the close integration of the industry with agriculture is still maintained advantageously in several districts such as the rich farming areas of the Pas de Calais and Nord which have the additional advantage of coal seams running literally underneath farm and field. Here is Lille, the centre of the textile industry, which is a very large market for technical oils, while the important consumer area of Paris is only just over 100 miles away. Here are also the Channel ports to which seeds for the oil mills and cotton for the cotton mills are shipped from overseas.

Originally the industry was based practically on indigenous oil crops alone. In 1862, 1,250,000 acres were cultivated with oilseeds of which 531,000 were under hemp and flax. In the following years this acreage began to decrease steadily under the impact of oil crop imports from overseas. In 1914 it had fallen to 153,000 acres and remained at about the same level until about the first years after the first world war, dropping to 127,450 acres, of which over 100,000 acres were under hemp and flax. In addition about 5-7000 tons of olive oil are produced annually. The table below gives the amount of oil seeds harvested in France.

The table demonstrates also the ever-increasing importance of oil seed imports up to the Occupation, when these gradually dried up completely and France was once more thrown upon her own resources which were hopelessly inadequate, despite greatly increased home cultivation.

For the sake of completeness the export figures are also shown in the table. In the case of seeds these are almost invariably re-exports and trans-shipments while in the case of oils, a certain amount of oil seed was pressed in France and the oil returned to the colonies and semi-refined oils were exported to neighbouring countries.

TABLE I

EXPORTS AND IMPORTS OF OLEAGINEOUS CROPS

(in 1000 tons)

	1862	1913/14	1938	1942	1943	1944	1945	1946
Home production of seeds	250	30	19	12	89	78	37	63
Imported seeds		960	1,247	164	—	—	316	271
Imported oils		45	81	8	—	—	67	40
Exported seed		17	4	—	—	—	—	—
Exported oil		53	88	18	—	—	—	—

This table is illuminating as showing that after an almost complete collapse of home production, cultivation re-started and even increased greatly during the war years, reaching a peak well above the pre-World War I. period. This is due to the great encouragement given by the Government to oil seed production by paying subsidies to farmers. Thus the prices for oil seed jumped from about 200 fr. in 1938 to about 800 fr. per 100 kg. in 1942. For comparison, the price of wheat increased from 300 fr. to 404 fr. per 100 kg. over the same period. The bulk of the seeds grown were colza (rape), poppy, grape and sunflower seed. The cultivation of olives was also given attention and in 1942 about 4 million fr.

were distributed to growers for improvement and expansion of olive groves.

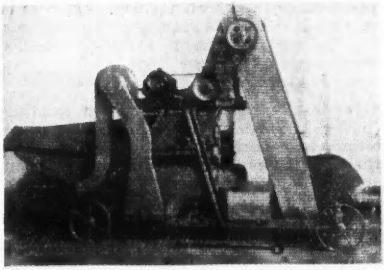
Grapeseed Oil

Particular attention and assistance has been given by the Government since 1940 to the production and utilisation of a very interesting and hitherto hardly exploited waste product; namely, grapeseed oil. It is estimated that about 22,000 tons of grapeseed oil could be produced annually in France, although it appears that actual annual war production amounted to only about 3000 tons of oil.

Grapeseed extraction is not a recent proposition, but large-scale commercial experience in dealing with this seed and the employment of special machines are of more recent date. The first experiments seem to have been carried out in Italy in 1771 and then from time to time these experiments were re-opened with greater or less success in Germany and France.

During the 1914-18 war the first large-scale mill was put into operation in France producing grapeseed oil for soap manufacture, followed by several solvent extraction plants which, however, closed down after some 10 years, due to the non-competitive price of the oil produced. In 1940 these factories re-opened and greater extraction capacity was being added.

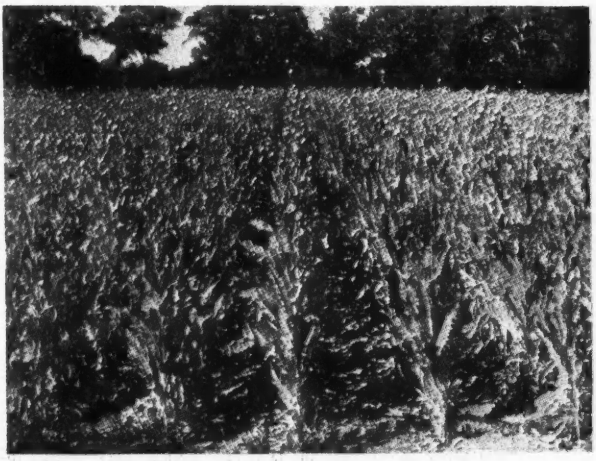
Grape pulp was mainly collected from the large private and co-operative distillers by a special organisation which also undertook the mechanical separation of the seed from the pulp commercially, an operation which the distiller could not undertake himself. The proper handling and storing of the pulp, both before and after distillation is of great importance since on it depend the quantity and particularly the quality of the grapeseed oil.



Specially designed as an auxiliary of the wine industry, the épépineuse helps to recover some 10 per cent of grapeseed from vineyard pulp

There are at present some 200 grapeseed separators (épépineuse) in operation in France to treat about 450,000 tons of pulp, which will yield approximately 45,000 tons of grapeseed, containing about 12 per cent of oil. This represents a yield of some 4000 tons of grapeseed oil. Mobile grapeseed separators are supplied by Terrin, of Marseille, Coq, of Aix-en-Provence, Samat, of Marseille, and Pépin, of Bordeaux.

Usually the wet pulp is treated, and contains in the average 50-60 per cent moisture. The separated grapeseed has consequently a considerable moisture content: 40-50 per cent, which has to be reduced for extraction to some 12 per cent. Drying is



A poppy field in France, of which the crop provides, among other products, a very valuable cattle feed with special qualities for fattening stock

carried out either immediately after seed separation or in the oil factory. Only in a few cases is the whole sequence of operations from the seed separation to oil production carried out in the same spot.

Extraction Processes

Grapeseed is usually dried in a rotating cylinder type drier with direct flue gas heating, but indirectly heated driers, using either steam or air are also in use. When the pulp is dried before seed separation a continuous press, built by Mabille, is used to reduce the moisture content mechanically as far as possible before drying, with the aim of reducing fuel costs for the drier.

The dried grapeseed extracts relatively easily. It is cleaned, flaked and solvent-extracted in the usual extractors, mostly of the vertical cylindrical type, though rotary extractors have also been used with success. The solvent is normally trichlorethylene.

The oil content of the seed and the physical and chemical characteristics of the oil vary a great deal with the variety of the grapes. Complete results were published by E. André, G. S. Jamieson, etc. It may briefly be mentioned, however, that for the average French grapeseed oil the iodine value varies between 120-140, the acetyl value between 15-20 and the density between 0.920 and 0.940.

Grapeseed oil is potentially an edible oil, but owing to the fact that storage and handling conditions of grape pulp and the seed are usually far from ideal, the oil has been used exclusively for technical purposes such as in paints, varnishes, factices, soaps, sand casting cores, lubricants, sulphonates, etc. The extracted residue is valued mainly as a fertiliser, some unsuccessful attempts having been made to use it as a component in cattle food. It has lately served in the manufacture of a coffee substitute and is also used as a boiler fuel.

Oil Cake

It has been mentioned that not the least important factor for the rapid development of the French oil industry was the excellen market for the presscake remaining after the oil has been expressed. More recently solvent- extraction meals became available, characterised by a very low oil content. Up to 1939 some 700,000 tons of oil cake and meal, representing 250,000 to 300,000 tons of proteins were consumed annually in animal rearing and fattening. Of this about 10 per cent reached the market in the form of a compound meals, containing carbo-hydrates and other nutritive components.

The composition of the oilcakes depends to a large extent on the method of production. Cakes obtained from presses of the Marseille type, contain 7-8 per cent of oil, from certain expellers even 10 per cent of oil, while solvent extracted meal may have as little as 0.5 per cent. The nutritional value of the oil in the cake is still a highly controversial subject in France and elsewhere but it can be stated that solvent-extraction meal has less tendency of becoming rancid and has therefore better keeping qualities as compared with press or expeller cakes. Its relative protein content is also higher. Table II gives the average composition of some French oil cakes, together with cakes from tropical oil-bearing materials, for comparison.

Relatively little attention has been given to systematic biological feeding experiments of home grown oil cakes in France. During the years of abundant imported oil cakes, home grown seed cakes were almost forgotten. Only rapeseed cake (colza) stayed and was known and appreciated by the average farmer. It is available with oil contents varying from 0.5-10 per cent. Well extracted cake from decorticated sunflower seed is a cattle food of highest value, similar to that of soya or groundnut cake. It is even claimed that its biological availability is even greater than of the latter two.

Poppyseed is appreciated for its traces of alcaloids, which make it particularly suitable for fattening purposes.

TABLE II

SHOWING COMPOSITION OF OIL CAKES (9)

	Protein %	Oil Content %	Cellulose %	Mineral Matter %
Groundnut :				
Expeller cake	27	9	15	5
Presscake	46	6	5.5	5.8
Extracted meal	48	0.5	5.5	5.8
Soyabean :				
Presscake	42	5	6	5.5
Extracted meal	44	0.8	6	5.5
Linseed cake	36			
Copra cake	21	6	8	5.5
Palm kernel cake	19	8	10	6
Decorticated cotton seed cake ...	41	10	22	3.8
Sunflowerseed cake	39	6	11	6
Rapeseed :				
Presscake	23	9.5	15	7
Extracted meal	31	1	15	7
Poppyseed cake	32	7	16	10

These figures are only approximate averages for materials containing 10–12 per cent moisture.

PROGRESS IN DRUGS AND FINE CHEMICALS—VII

Antibacterial Uses of Furane Products

by G. COLMAN GREEN, B.Sc., F.R.I.C., A.M.I.Chem.E.

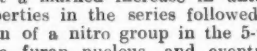
ANOTHER new and interesting series of synthetic chemotherapeutic agents of relatively simple structure is that of the derivatives of furane which is obtainable by dehydration of the pentose from oat hulls. Its derivatives, furfuraldehyde and furoic acid, have been known to have a

urfuraldehyde, R=CHO
furoic acid, R=COOH.

Nitrofurazone

measure of antiseptic action since 1923. Anæsthetic activity was observed by Gillman and Pickens and by Koch and Cahn in 1925; but furan and its derivatives were neglected pharmacologically on account of pronounced toxicity.

In 1944, Dodd and Stillman (*J. Pharmacol. and Exp. Therap.*, 1944, *82*, 11) reported that a marked increase in antibacterial properties in the series followed the introduction of a nitro group in the 5-position of the furan nucleus, and eventually 5-nitro-2-furfuraldehyde semicarbazone (nitrofurazone; " Furacin ") was found best to afford bacteriostatic properties combined with low toxicity. The discovery that the presence of the nitrofuran nucleus with variations of the side chain



produces compounds which inhibit the growth of bacteria and are, it is claimed, non-corrosive, non-irritant and non-toxic is covered by a series of seven patents. U.S.P. 2,416,233 to 2,416,239 inclusive.

Nitrofurazone has a wide antibacterial spectrum covering both gram-positive and gram-negative organisms. The agent is rather more bactericidal than bacteriostatic and some strains of normally susceptible bacteria may prove resistant *in vivo*. At the same time other organisms not normally inhibited in broth culture may be inhibited *in vivo*. The reasons for this variability are not clear, but the effect is thought to depend upon variations in solubility according to particular circumstances. The drug is not very soluble in water, actually 1/4200; but solubility is higher in propylene glycol (1/300) and polyethylene glycol (1/100).

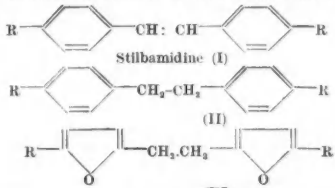
While the clinical applications of nitrofurazone have developed mainly along the lines of topical administration (Downing *et al.*, *J. Amer. Med. Ass.*, 1947, *133*, 299) successful oral application in experimental infections in animals, especially with streptococci and trypanosomes, have been reported. Toxicity is low and 3 grams have been administered to man by the oral route on each of three consecutive days without ill-effects, except for the nausea reported in a few cases. Sensitisation has been observed but the risks of this are not considered to be greater than with penicillin or with sulphathiazole. The nitrofurazones are neither fungistatic nor fungicidal.

Wiggins and co-workers (*J. Chem. Soc.*, 1947, 396) have investigated other furane derivatives for chemotherapeutic properties. Since Warrington Yorke's discoveries in 1940, the amidines have become well-established therapeutic agents in the treatment of the predominating tropical diseases of trypanosomiasis and leichmaniasis.

Most Active Form

Ewins *et al.* (*J. Chem. Soc.*, 1942, 103) found stilbamidine to be one of the most active agents in the series. It is 4 : 4′-diamidino-stilbene (I). Exploring the furfuryl analogues of amidines only 5 : 5′-diamidino—$\alpha\beta$-2 : 2′-difurylethane (III), the analogue of 5 : 5′-diamidino-$\alpha\beta$-diphenylethane (II), showed trypanœidal activity according to Wiggins. The minimum effective dose was 0.025 mg./gram and the maximum tolerated dose was 0.25 mg./gram.

The authors prepared the drug by the treatment of sucrose with oxalic acid to yield 5-hydroxymethylfurfuraldehyde which is converted to the 5-bromo-derivative



Stilbamidine (I)

(II)

(III)

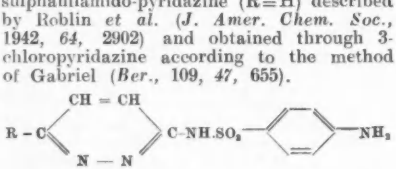
R= -C(: NH). NH_2

and thence to $\alpha\beta$-2 : 2′-difurylethane-5 : 5′-dialdehyde. The dioxime yields the 5 : 5′-

(*Continued overleaf*)

dicyano compound which, on dehydration, yields the di-imino ether. Alcoholic ammonia at 110°C. converts the last to the required diamidino compound.

Seeking new uses for sucrose (which it is difficult to realise was often available in excess of world consumption a decade ago), Wiggins in association with Averend (*J. Chem. Soc.*, 1947, 239) and with the aid of a grant from the Colonial Products Research Corporation has also explored the conversion of sugar to pyridazine derivatives. The point of interest here is that hitherto, with one exception, all sulphonamides derived from six-membered ring diazines have been derivatives of pyrimidine or pyrazine. The one exception is 3-sulphanilamido-pyridazine (R=H) described by Roblin *et al.* (*J. Amer. Chem. Soc.*, 1942, *64*, 2902) and obtained through 3-chloropyridazine according to the method of Gabriel (*Ber.*, 109, *47*, 655).

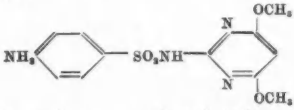


This sulphonamide was found to be active *in vivo*, well-absorbed, but low in *in vivo* activity. Wiggins, however, has found 3-sulphanilamido-6-methyl-pyridazine (R=CH_3) to have advantages over sulphathiazole both in respect of *in vitro* bacteriostasis against *Str. hæmolyticus*, *S. aureus*, and *E. coli* and in respect of solubility of the compound and its detoxication product, the N-acetyl derivative. Biological tests proceed at the date of the report.

Less Rapid Progress

The pace at which work in the sulphonamide field has proceeded has, however, become much reduced relatively to the succession of discoveries in this particular field over the period 1937 (when Ewins and Phillips discovered the effect of sulphapyridine) to 1942 when Roblin *et al.* (*J. Amer. Chem. Soc.*, 1942, *64*, 2905) concluded that the discovery of chemotherapeutic agents of the sulphonamide class with greater activity than that shown by the sulphapyrimidine group was unlikely.

Subsequently, attention has been diverted somewhat towards establishing conditions of reduced toxicity among the known types of sulphonamides. For example, Gage *et al.* (*Br. J. Pharmacol. and Chemother.*, 1947, *2*, 149) have found reduced toxicity and enhanced persistence in the blood to be exhibited by sulphanilamides derived from 2-amino-4 : 6-dialkoxypyramidines, among which series the parent compound, 2-*p*-aminobenzene sulphonamido-4 : 6-dimethoxy pyrimidine ("sulphadimethoxypyrimidine") prepared by Rose and Tuey (*J. Chem. Soc.*, 1946, 81) was the most effective.



This result was confirmed independently by van Dyke *et al.* (*J. Pharmacol.*, 1948, *83*, 203). The drug has been found to be more slowly absorbed than sulphadiazine, sulphamezathine or sulphamerazine by rat and mice but to be more persistent in the blood stream. *In vivo* the antibacterial performance against *S. Pyogenes* in mice is at least as good or slightly better than the other sulphapyrimidine derivatives.

Subsequently, Bevan and Luxton (*Br. J. Pharmacol. and Chemotherap.*, 1947, 2, 163) confirmed the persistence of the drug in the human bloodstream and found it was well tolerated, showed definite therapeutic activity, but was not so effective as other sulphonamides in human pneumonia.

Lehr's Investigation

Lehr also has investigated an aspect of the reduction of toxicity of the sulphonamides. He has proposed (*Brit. Med. J.*, December 12, 1947, 943) that mixtures of sulphonamides be used in order to prevent renal damage through crystallisation of the sulphonamide in the kidney tubules which is an ever-present risk in sulphonamide chemotherapy.

The proposal to administer mixtures of sulphonamides emerges from a simple observation that a saturated aqueous solution (or urinary solution) of one of these drugs could be fully saturated by a second and by yet a third sulphonamide if the latter were only slightly different in molecular structure. Hence the maximum concentration achievable is an additive property.

It was argued that, by employing combinations of *partial* dosages rather than full doses of any one of the drugs the risk of formation of crystals in the renal tubules might be much reduced. This suggestion was, in fact, confirmed and also the fact the chemotherapeutic effect of the mixture of sulphonamides, each in partial dosage was approximately proportional to the total content of sulphonamides. Mixtures of sulphonamides in partial dosages are already marketed in Great Britain, one such containing per 0.50 gram tablet :—

1. Sulphathiazole, 0.185 gram.
2. Sulphadiazine, 0.185 gram.
3. Sulphamerazine, 0.130 gram.

(*To be continued*)

Famous Physicists and Chemists Commemorated

MANY postage stamps have been issued in recent years in honour of leading figures in physics and chemistry by the various postal authorities, and the recent commemorative issues noted here represent a growing recognition of the human debt to scientists of many countries.

Louis Pasteur, the French chemist responsible for the discovery of pasteurisation process and other distillery practices, has been honoured by several stamp issues of France, commencing with the 1923 series of eleven values showing his head only. The most outstanding design, that of 1936, depicts Pasteur looking at a test tube, and appears on the 1 f. 50 c. + 50 c. (blue) denomination of a series commemorating certain well-known personalities. These stamps were issued with a surtax in aid of the Unemployed Intellectuals' Relief Fund. This same design was re-issued in a 1938 series for the 1 f. 75 c. + 25 c. (blue) value to help the same fund.

The magnificent work of Pierre and Marie Curie is commemorated by a fine study of the brilliant physicists at their apparatus, which appears on the 1 f. 75 c. (blue) stamp issue of France, released in 1938 to mark the 40th anniversary of the discovery of radium. This particular stamp issue carried a surtax of 50 c. to aid the International Anti-Cancer Fund.

Antonio Pacinotti, together with a picture of the original dynamo he invented, appears on a set of two Italian stamps—50 c. (violet) and 1 lire, 25 c. (blue)—released in 1934 to mark the 75th anniversary of his achievement.

Luigi Galvani was honoured by a series of two stamps marking the occasion of the first International Congress of Electro-Radio-Biology, the denominations being 30 c. (brown on buff) and 75 c. (red on pink).

Russia has paid tribute to the research work of Prof. K. A. Timiryasev, who devoted his studies to plant life and chemicals, by producing a series of four stamps in 1940. Each stamp value bears a different design. The 10 kopecks (blue) carries a miniature portrait of Timiryasev and a view of the Academy of Agriculutural Sciences, Moscow; the 15 k. (violet) shows the professor at work in his laboratory; the 30 k. (brown) presents a full face portrait; and the 60 k. (green) provides a picture of the monument erected in his name.

Most recent philatelic acknowledgment to scientific eminence is the recently issued Polish stamp providing an exceptionally fine portrait study of Marie Curie, printed on a 10 zloty (grey-black) value.

Top, left to right: K. A. Timiryasev (Russia); Mme. Curie (Poland); Pierre and Marie Curie (France)

Left: Antonio Pacinotti (Italy)

Right: Luigi Galvani (Italy)

Chemical Plant Shortage

Scottish Manufacturers Face Big Demand

SCOTTISH chemical machinery manufacturing firms are generally very fully employed and see no real reduction in demand for equipment for a considerable time to come. In practically every instance the practice is to produce chemical plant as a section of pumping, sugar, gas, food or similar equipment production, a policy which ensures a very comprehensive range of products but which has the defect, as at present, of limiting chemical output to a given ratio of the whole.

Centrifugals have been particularly in demand and have been continuously improved by the specialist builders who do this work. To-day Glasgow manufacturers are turning out an increasing volume of fast, automatically controlled machines for a wide variety of purposes. Sugar plants are important buyers, existing business representing 150 per cent in value and 40 per cent in tonnage more than the immediate pre-war years. Main sugar machinery markets are Empire countries and Central and South America, where a process of plant replacement has been adopted.

A great deal of work is reported in progress in pumping sections where the individual problems of firms engaged on separate branches of production are being studied. This branch of the industry is handling a very large proportion of the demand and anticipates continuous work for some years to come.

Herring Oil Prospects

Processing Plant Installed at Wick

SOME "startling developments" in the use of herrings in the production of edible oils and protein were foreseen by Sir Frederick A. Bell, chairman of the Herring Industry Board, speaking at Edinburgh last week about the important extraction plant which the board is establishing at Wick. This is the first large-scale commercial undertaking of its kind in Britain and is perhaps, technically, the most important advance in the work undertaken by the board last year.

Plant to convert surplus catches into meal and oil has now been established at Wick. Processing of catches which did not find outlets through the normal channels will be carried out there. The oil is particularly well adapted to the manufacture of margarine.

Wick was chosen as the processing centre because premises were easily obtainable there, and under present conditions it was impossible to erect them elsewhere.

Parliamentary Topics

Linseed Allocations.—111,732 tons of linseed oil were imported in 1947 and in addition 40,198 tons of linseed, of which the oil equivalent was 13,399 tons. It would not be in the public interest to give details of the allocations of linseed oil as between industries.—Sir Stafford Cripps.

Soda Ash.—Urgent steps are being taken to increase the production of soda ash and it has recently been possible to make a small increase in the allocation to the glass container industry, but its requirements cannot be met in full for some time to come; and in the meantime it will be necessary to continue to supplement home supplies of containers by imports.—Mr. A. G. Bottomley.

Electricity Vesting Date.—After careful consideration, and after consultation with the British Electricity Authority, and with the agreement of the Secretary of State for Scotland, it has been decided that the vesting date should be April 1, 1948, and an Order has been made to this effect.—Mr. H. T. Gaitskell.

Formaldehyde Production.—The present rate of formaldehyde production is about 6000 tons per month. No supplies were imported in 1947, but home production was greatly in excess of 1938. Production cannot be expanded until more supplies of methanol are available. There is a general world shortage, and no imports are expected this year.—Mr. J. H. Wilson.

German Potash.—Contracts have been placed for the purchase of all the German potash that the Russian zone is prepared to sell. More than half the British requirements are being met from this source. Small quantities have been acquired from the British zone, where efforts are being made to increase production.—Mr. J. H. Wilson.

Staggering Order Suspended.—Announcing that Regional Boards for Industry were being asked to prepare for a general suspension of the staggering of working hours from March 29, the Minister of Labour (Mr. G. Isaacs) said: "I should emphasise that the problem next autumn will be no less serious than that which faced us last autumn, and that the system of staggering hours will have to be reintroduced at about the same period as last year."

Better Coal Output.—Coal production last week totalled 4,148,000 tons, an increase of 113,100 on the previous week, and the best since the week ending December 20. In order to reach the 1948 target figure of 211 million tons, the weekly aggregate will have to rise above 4,220,000 tons.

AUSTRALIA'S INDUSTRIAL CHEMICALS

Many New Industries Based on War Production

by HAROLD P. BREEN

(*Director, Australian Division of Industrial Development*)

THE resources of a well-balanced chemical industry are vital to successful industrial production. When the second world war began in September, 1939, Australia was importing some 190 chemical commodities then considered most essential to continued production—particularly of munitions and food-processing. In local output the country was completely independent in only 50 basic chemical materials. Of the imports—sulphur from the U.S.A., ammonium nitrate, phosphorus and the alkalis from Great Britain, sodium nitrate from Chile, and potassium chloride from Palestine, were among the most important to the life of the Dominion.

AUSTRALIA'S exceptionally rapid development during and since the war in the production of chemicals has been partially revealed by many recent news items reflecting the increasing concentration of interest in the Dominion of established chemical industries in this country and elsewhere. While it is too early to provide a complete picture of Australia's chemical potentialities in the near future the accompanying article provides a valuable review of recent developments and current policy.

100 New Chemicals

When the war ended in 1945, Australia was making 129 basic chemical materials—actually 70 more than before the war. Over 100 additional chemicals were now being processed as a result of wartime expansion. Imports of the essential chemical materials had also considerably changed in character. Of the 110 commodities now imported, some 53 chemicals were also made in Australia, but not in sufficient quantities to satisfy local requirements.

During this period new chemical products had also been added for the first time to Australian's manufacturing range. Of these, aniline had been made for explosives, chlorinated products for munitions and solvents, caustic-soda for soaps, and synthetic phenol for plastics. Agar made from Australian seaweed assisted in food-processing; locally produced alkalis had increased the nation's self-sufficiency in heavy chemicals; while penicillin and the sulpha drugs—sulphaguanidine, sulphamerazine and sulphathiazole—helped to combat disease for Australia's fighting forces.

This change towards greater industrial strength by increased chemical manufacturing was brought about in three stages. First, the five existing Commonwealth Government factories—three making arms and ammunition and one each for explosives and chemical defence—expanded to cover greater war-production. Next, additional chemical plants were built and equipped to accommodate entirely new chemical production techniques in many cases. And, finally, commercial chemical industries were greatly extended by the erection of the Commonwealth Government annexes.

Close Control

The Commonwealth Government immediately imposed control on all essential chemical materials and endeavoured to build up stocks most vital to war production. This national control of chemicals was an outstanding feature of Australia's wartime economy. It helped considerably to meet production requirements for munitions, defence equipment, and foodstuffs, until the new wartime chemical plants attained greater production. As the war in Europe was intensified, overseas supplies of chemicals became more difficult to obtain. Then, when Japan struck in December, 1941, Australia was threatened with both total blockade and invasion, and was thrown almost entirely on her own resources.

The first stage of development began with ammunition and explosives. The nation's whole chemical resources were directed towards their manufacture. Whereas Australia's chemicals production was previously concentrated in the industrial cities of Melbourne and Sydney, decentralised factories were now the keynote of wartime expansion.

Since 1922, the Commonwealth Government Explosives factory at Maribyrnong, in Victoria, had supplied Australia's requirements in cordite, TNT, nitro-glycerine and other defence chemicals. Plant and building were now extended to cover greater production and, in addition to make baratol, guncotton, cellulose, solvents and various shell-fillings.

Another factory was built at Ballarat, also in Victoria, for making guncotton. As cotton was in short supply, successful experiments were carried out with paper as a substitute under the direction of Australia's leading

(*Continued overleaf*)

COAL EXPERTS FOR QUEENSLAND

THE names of the team of experts from Powell Duffryn Technical Services who will carry out a survey of the Queensland coal-fields have now been announced in Brisbane by the Premier, Mr. Hanlon. They are: Mr. D. G. Hemmant, Dr. R. L. C. Bleeck, Mr. F. G. Massman, Dr. J. Howard Griffiths, and Mr. R. J. Evans. The team will leave England by Constellation aircraft on March 13.

The dispatch of the mission follows the agreement signed in November by Mr. Foot and Mr. Hanlon under which Powell Duffryn Technical Services were appointed consultants to the Queensland Government in connection with the coal resources of the State and the efficiency of their present production and future developments.

Dr. Griffiths is a chemical engineer and fuel technologist. He was senior investigator and acting director of research on coal dust of South Wales and Monmouthshire Coal Owners' Association. He was also senior lecturer in the Mining Department of University College, Cardiff. For many years he was closely associated with the late Prof. T. G. Jones on dust research and connected problems.

Mr. D. G. Hemmant, the leader, who was recently appointed a managing director of Powell Duffryn Technical Services, is a mining engineer with a long record of service in the Powell Duffryn Group. Dr. Bleeck is the company's senior geologist, Mr. Massman is a mining engineer and was for three years manager of Monk Bretton Colliery in Yorkshire, and Mr. Evans is a mining engineer and surveyor.

£2M. TASMANIAN FERTILISER PLANT

THE Electrolytic Zinc Corporation of Australasia is in the process of setting up a £2 million plant to make 50,000 tons of ammonium sulphate a year at its works near Hobart, Tasmania, according to advice received in New York by the Australian News and Information Bureau. The plant is expected to be in full production by 1952. Announcing the company's decision to build the factory, the Premier of Tasmania said there was a world shortage of nitrogen fertiliser and every indication that a hungry world would need increasing supplies of food for many years. If the projected factory proves successful, others for the production of different concentrated fertilisers will be built.

Scope of the Groundnut Scheme

At the annual meeting of Widnes Chamber of Commerce, Mr. G. A. S. Nairn, chairman of Lever Brothers, Port Sunlight, Ltd., indicated the phenomenally wide scope of the Government scheme for the mechanised production of groundnuts in the bushland of East Africa. "We shall have to build tens of thousands of homes, we shall need engineering and agricultural supervisors, doctors, and scientists, and in all, it will cost at least £25,000,000," he said. "The 3,250,000 acres to be developed are to be divided into farm units each of 30,000 acres. Each unit will employ at least 200 Africans, and the aim is to establish the labour force as a stabilised community living with their families in villages, each having an African population of over 1200 men, women and children."

AUSTRALIA'S INDUSTRIAL CHEMICALS

(Contd. from p. 273)

explosives authority, A. E. Leighton, who was consultant for the Commonwealth. The paper was made from wood cellulose prepared at Maryvale, Victoria, from Australian "pinus radiata" timber. Some 7000 tons of gunpaper were produced annually at Ballarat during the war.

Largest Explosives Factory

From 1940 to 1942 the largest explosives factory in the southern hemisphere was built at Salisbury, in South Australia. This plant, covering 5186 acres, produced ammonium nitrate, ballistite and cordite, nitric acid and tetryl, in addition to percussion caps and shell-fillings.

In New South Wales, three more explosives factories were in production by 1943. At St. Mary's, 29 miles from Sydney, Australia's second largest explosives factory began operations on ammunition, flame-floats, cartridge and shell-filling, flares and seamarkers in 1942. At Villawood, also near Sydney, another factory was built to make nitric acid, oleum and TNT. Also, at Mulwala, in southern New South Wales, another "feeder type" of factory—like that of Ballarat, in Victoria—the manufacture of nitro-cellulose and nitric acid began work in 1943.

Before the war nitric acid had been made in Australia from nitrate of soda imported from Chile. Four Government explosives factories are now equipped with plants for making nitric acid from ammonia supplied by local gas and steel industries.

In thus preparing for war production, Australia not only achieved a greater and wider distribution of chemical manufacturing, but forged another link in the chain of her rising industrial strength.

German Science Reviewed

Comprehensive Chemical Study this Year

THE Foreign Office announces the publication and distribution of the first volumes of the "FIAT Review of German Science," compiled by German experts under the direction of the British, American and French Field Intelligence Agencies (Technical). The review is written in German and covers fundamental research in pure science during the years 1939-46.

By agreement between the British, American and French FIAT's, the first printing is a restricted edition for official distribution between the three Allies and UNESCO. The British share of about 250 sets will be issued to Governmental and other bodies within the Commonwealth, to universities and medical schools and to the libraries of certain learned and professional societies. It is hoped that the edition will be completed within the next six months.

The Allied edition of the FIAT Review will be followed by a German edition. The latter, also printed in German, will be published by Dieterich'sche Verlagsbuchhandlung, Wiesbaden, Germany, and will be obtainable through normal trade channels. It is understood that volumes will not be sold separately but only in sets comprising the titles under each of the six subject headings.

The chemical subjects covered by the review are set out in the following list of title :—

Inorganic Chemistry (I to VI), W. Klemm; Analytical Chemistry, W. Klemm; Physical Chemistry, K. Clusius; Theoretical Organic Chemistry (I and II), W. Hückel; Preparative Organic Chemistry (I to III), K. Zeigler; Biochemistry (I to IV), R. Kuhn; Pharmacology and Toxicology (I to III), F. Eichholtz; Chematherapeutics, F. Schönhöfer; General Metallurgy, M. Hansen; Non-ferrous Metallurgy (I and II), M. Hansen.

NATIONALISED PHARMACIES ?

THE possibility that the Swedish Government will take over the ownership of all pharmacies was referred to by Dr. I. Michaels in the course of a paper on Scandinavian pharmaceutical practice read to the Pharmaceutical Society of Great Britain. The Swedish Parliament, he said, was still studying the matter. The Government there had requested that an investigation be made into the possibilities of reducing the retail cost of medicines and medicaments. Particular attention was to be paid to the question of whether a wholly or partially owned industry and pharmaceutical service would not achieve these results.

World Paint Congress

Important Reviews to be Published

AWAITED with considerable interest is the publication of the full reports of the First International Paint and Allied Industries Congress in Paris (October 1-5, 1947) at which much original material was presented before an attendance of about 800, representing 18 countries. Papers read in plenary session included :—

1. Macromolecular chemistry and progress in the paint industries, by M. Champetier, of the Sorbonne, research director for paints and varnishes.

2. Modern views on the chemistry of drying oils, by Dr. Kappelmeier, managing director of Sikkens Lak-fabriken.

3. Present state of knowledge of Congo copals, by Dr. H. Hellincke, professor, Inst. of Applied Science, Louvain University.

4. Organic protective coatings in industry, by Dr. J. J. Mattiello, vice-president of the Hilo Varnish Corporation.

5. Film-forming properties of unsaturated polyesters, by Dr. Blom, director, Testing of Materials Laboratory, Zurich.

6. Anti-fouling paints, by Dr. Keenan, of Beck & Koller Co., Ltd.

Papers read in the eight sections of the congress numbered 110, the principal fields covered being : Properties and use of pine rosin derivatives (seven papers), standolisation of drying and semi-drying oils (8), nitrocellulose and related products (5), rheologic phenomena in paints (3), photoelastic study of standoil and oil varnish films (1), optical characteristics of varnish and paint films (3).

DROP IN GERMAN CHEMICALS

REPORTING on the decline in German chemical production during the latter end of last year, for the Canadian journal *Foreign Trade* (January 24), Mr. D. W. Jackson, Canadian economic representative, says this was largely due to the shortage of electric power. Output of calcium carbide in the United States zone dropped from 7500 tons in September to 4200 tons in October, and production of caustic soda was affected, though not to the same extent. Although output of numerous individual chemicals such as sulphuric acid, soap and dyestuffs increased, chemical production generally in the United States zone declined about 13 per cent during the month.

Argentine Calcium Carbide Imports.—The Secretariat of Industry and Commerce has fixed the import quota of calcium carbide into Argentina for the year 1948 at 20,250 metric tons.

Technical Publications

THE importance of maintaining efficient first-aid services in industry is well recognised. Some authorities, however, of whom Dr. R. A. Trevethick is one, are of the opinion that new ideas and developments are only slowly adopted. This is a point which he brings out in his preface to "Advanced Industrial First-Aid, 1947," and to which, in a foreword, Sir Reginald Watson-Jones (H.M. Orthopædic Surgeon) subscribes. Dr Trevethick, who draws on his experience as medical officer to Steel, Peech & Tozer, Sheffield (branch of the United Steel Companies, Ltd.), says of the tourniquet: ". . . . one of the most dangerous appliances used in first-aid, and has caused more trouble than it has prevented." Copies are obtainable from Henry Garnett & Co., Ltd., *Advertiser* Office, Rotherham, Yorks, price 3s.

* * *

An opportunity arises to read authoritative views on the functions and responsibilities of that important (and often unappreciated person—the "buyer,"—more formally designated nowadays as the purchasing officer. It is the result of a talk to members of the National Conference of the Purchasing Officers' Association, held at Cheltenham last June. The speaker was Mr. D. Wragg, local director of Thos. Firth & John Brown, Ltd., Sheffield, whose experience in this field is considerable. This paper, which has now been published in the form of a booklet by the association, will repay scrutiny.

* * *

A booklet entitled "Can Cavalcade in the Corner Drugstore," which deals with the history and development of metal cans for packaging chemicals, drugs and cosmetics, has just been issued by the Can Manufacturing Institute, 60 East 42nd Street, New York, 17. It traces the evolution of these containers, and a descriptive text is illustrated with appropriate photographs and cartoons.

* * *

Another descriptive leaflet on non-ferrous metals—this one deals with solder—has been issued by Federated Metals Division, American Smelting and Refining Company, 120 Broadway, New York, 5. It describes basic and special solder types and gives application data and useful information on a number of other solders including acid core, rosin core, solid wire, and body solders.

It is not unusual to find a publication privately produced for restricted circulation such as the "Bulletin" of Johnson, Matthey and Co., Ltd., which deals with business and social affairs and at the same time outlines the origin, processing methods and uses of its products. This the "Bulletin" in its February-March (1948) issue offers in good measure. There is plenty of readable, non-technical information on silver, gold and platinum and their alloys that would deserve a place in many a more widely circulating journal. Of particular interest are the references to the applications of gold in the chemical industry, and of gold salts in the treatment of diseases.

Fuel Abstracts

Research Service for Industry

FUEL efficiency—of vital importance to all branches of industry—has a double significance for the chemist, for to him fuel burning is in one sense an extravagant misuse of a valuable raw material—whether it be coal, petroleum, lignite or peat. His interest in fuel economy, it is argued, should therefore be all the greater and he should know more about fuel combustion than any other industrial user. For this reason, importance attaches to *Fuel Abstracts*, edited and compiled by the Fuel Research Station, Greenwich, S.E.10.

Attention is drawn to this service in the latest issue of *Fuel Efficiency News*, published by the Ministry of Fuel and Power. It is recalled that in 1947, 10,000 abstracts were presented in monthly instalments of 750, each issue being classified into 20 sections. Information is not confined to fuel problems in this country alone, but includes contributions from many overseas countries such as the U.S.A.

Columbian Iron-Ore Plan

The Columbian Government is to undertake the commercial exploitation of the iron-ore deposits discovered several years ago at Paz del Río, in the Department of Bojacá. Previous proposals received from American and Belgian concerns for this enterprise had been rejected. The undertaking is to be of a semi-official nature, financed both with Columbian and foreign capital. Loans in foreign currency would probably be limited to the cost of equipment and materials required from abroad.

It is understood that a mission will visit Mexico, the U.S.A. and Europe to study modern methods of operation.

Three Awarded Chemistry Honours

Beilby and Harrison Memorial Prizewinners

THE administrators of the Sir George Beilby Memorial Fund, representing the Institute of Metals, the Royal Institute of Chemistry and the Society of Chemical Industry, normally meet once a year to consider the making of awards from the interest derived from the invested capital of the fund. These awards are made to British investigators in science as a mark of appreciation of distinguished work, particularly in such fields as fuel economy, chemical engineering and metallurgy in which Sir George Beilby's special interests lay.

In general, the awards are not applicable to the more senior investigators but are granted as an encouragement to younger men who have done independent work of exceptional merit over a period of years.

Owing to the war no awards were made in respect of the years 1941-46 inclusive, but at a recent meeting of the administrators it was decided to revert to normal practice and to make awards for 1947 to the following investigators:—

Geoffrey Vincent Raynor, M.A., D.Phil., F.R.I.C., F.Inst.P., for his researches on the constitution of alloy systems.

George Reginald Rigby, B.Sc., Ph.D., A.R.C.S., D.I.C., A.R.I.C., for his researches on refractory materials.

Dr. G. Raynor, born in Nottingham and educated at Nottingham High School, and Keeble College, Oxford, was early in his career associated with Dr. W Hume-Rothery, as his research assistant in work on factors affecting the formation of magnesium alloys. Following election to a DSIR Senior Research Award, he continued investigations on magnesium alloys and obtained the degree of D.Phil. in 1939.

During the war Dr. Raynor was concerned, in association with Dr. Hume-Rothery and others, with work on the constitution of certain steels and aluminium alloys on behalf of the Service Ministries. Early in 1945 he entered the Metallurgy Department of the University of Birmingham as Research Fellow and became Reader in Theoretical Metallurgy two years later.

His work in Birmingham has been directed towards a better understanding of the theory of alloy formation, with particular reference to the behaviour of the transitional metals, and the factors governing equilibrium relations in ternary alloys.

Dr. Raynor is a Fellow of the Royal Institute of Chemistry and of the Institute of Physics, and serves on several metallurgical research committees.

Dr. G. Rigby, who was educated at Hanley High School, and studied chemistry at the North Staffordshire Technical College, was awarded a Royal Scholarship at the Imperial College of Science and Technology (Royal College of Science) where he obtained two years later the A.R.C.S. diploma and the B.Sc. degree of the University of London with 1st Class Honours. He spent the next two years in the Physical Chemistry Department of the College engaged in research under the late Prof. J. C. Philip on the measurement of electrical charges at gas-liquid interfaces, and was awarded the Ph.D. degree for a thesis on this subject.

His appointment in 1932 to the staff of the British Refractories Research Association brought him into touch with the Staffordshire pottery industry in which his interest had been aroused while a student at the technical college. Initially under the direction of the late Dr. J. W. Mellor and, since 1937, of Mr. A. T. Green, Dr. Rigby has been engaged continuously on a wide range of research work on refractory materials for the pottery industry, and latterly for the iron and steel industry.

HARRISON MEMORIAL PRIZE

AT the recent meeting of the Harrison Memorial Prize Selection Committee, which consists of the presidents of the Chemical Society, the Royal Institute of Chemistry, the Society of Chemical Industry, and the Pharmaceutical Society, it was decided that the Harrison Memorial Prize for 1947 should be awarded to Dr. Derek Harold Richard Barton. The presentation of the prize will be made at the annual general meeting of the Chemical Society at Oxford on Thursday, March 18.

Dr. Barton studied at the Imperial College of Science and Technology, London, where he graduated in 1940 with First Class Honours, and was awarded the Hofmann Prize for special distinction in organic chemistry. He is now an I.C.I. Research Fellow in the Department of Inorganic and Physical Chemistry at the Imperial College.

This prize is awarded for outstanding merit in any branch of pure, or applied, chemistry. It was created in 1922 to commemorate the devoted services of the late Colonel Edward Frank Harrison, formerly deputy controller of the Chemical Warfare Department, to the protection of the British Forces from poison gas in the 1914-1918 war. It is awarded to the British chemist, under 30 years of age, who, in the opinion of the Selection Committee, has during the previous five years conducted and published the most meritorious and promising original investigations in chemistry.

PERSONAL

MR. F. G. C. FISON, chairman of Fisons, Ltd., has flown to South Africa, Rhodesia and Kenya for business purposes. He will return to London on March 30.

DR. ROBERT C. GOODING WILLIAMS, executive engineer of the North American Philips Co., Inc., has been appointed chief engineer of Philips Electrical, Ltd., to advise the managing director on all technical matters.

Johnson, Matthey & Co., Ltd., has announced the following promotions: DR. J. C. CHASTON to be deputy manager of the Research Laboratories; and MR. F. M. LEVER to be head of the chemical section of the laboratories.

MR. R. F. HEWSON, formerly in charge of production control in the plastics department of the Triplex Works, Willesden, N.W., has transferred to the sales staff. His successor in production control is by MR. J. E. SHARPE, formerly chief administrator in the Indian Ordnance Department, New Delhi.

PROF. B. CHAIN (Oxford University), the authority on penicillin research and a Nobel prizewinner, was one of the official guests at the ceremonial laying of the foundation stone of the new State laboratory in Rome for the production of penicillin, which is being established with UNNRA aid.

Spalding Urban Council has appointed CAPT. R. C. ARNOLD, the 26-year-old deputy gas engineer, as chief engineer and manager of the gas undertaking, in succession to MR. FRANK HARVEY, who is returning to Bilston, Staffs, as chief engineer. Capt. Arnold is a chartered gas engineer and a member of the Institute of Fuel

The American Society of European Chemists and Pharmacists has decided to commemorate the 70th birthday of PROF. CARL NEUBERG, the founder of biochemistry by the establishment of a Carl Neuberg Medal to be awarded annually in the form of a citation and silver medal to an outstanding personality credited with special contributions to science.

Obituary

MR. HUGH JARVIE, chemical manufacturer, has died at Oswald Villa, East Lefroy Street, Coatbridge, Lanarks.

SIR GEORGE ARTHUR MITCHELL, an authority on mining, who had a lifelong association with the coal, iron and steel industry, died this week at Drymen, Scotland, aged 88.

Deadly Playthings

Police Investigate Pistol Cap Mishaps

"THERE have been up and down the country several explosions of an obscure character which have led to warnings by the police in regard to explosives used as playthings and it is very important there should be very careful control in these matters," said the Liverpool City Coroner at the adjourned inquest last week on Michael Finnigan, aged nine, of 70 Islington, Liverpool, the victim of an explosion in the cellar of his home on February 3. The jury returned a verdict of "Misadventure."

It was stated that the boy had gone into the cellar to play with some toy pistol percussion caps. His mother stated she had complained of a smell of gas in the cellar about six months ago and gas men called and effected a repair. Detective Sergeant Leonard Bennett said it was believed these caps were supplied by an unlicensed manufacturer and proceedings would be taken against the firm for manufacturing caps without the authority of the Home Office Explosives Department.

Dr. J. B. Firth, director of the Home Office laboratory at Preston, said he formed the opinion that at the time of the explosion the boy had been using an electric lamp, remnants of which were dispersed around the room. Describing the sheets, which contained 560 caps each, he said the caps were a composition of red phosphorus and potassium chlorate, and were of a highly-sensitive nature. Several sheets must have exploded.

MERCURY VAPOUR RECTIFIERS

THE substitution of alternating current for the direct current of the pre-grid era, still frequently presents industry with difficult problems in adapting electricity supplies, chiefly that of obtaining direct current for motors driving a large variety of machines, and which for many reasons are not adaptable to alternating current Hitherto, it has been possible to convert A.C. to D.C. only by means of a rotary converter or similar device, which is often a costly, and inconvenient expedient

Industrial users of electricity to whom this problem may appear insoluble, but to whom, nevertheless, a remedy is of paramount importance, will be interested by the claims of the Phillips Electrical mercury vapour rectifier. This machine is said to be capable of producing a smooth supply of direct current, and a wide variability of drive speeds at a relatively low cost. Installation is stated to be rapid and simple.

Home News Items

Purchase Tax.—Immersion water heaters with a loading of less than 4 kilowatts are to be chargeable with purchase tax.

Aluminium Standards for Shipping.—Lloyd's Register of Shipping has published tentative requirements for the quality and testing of aluminium alloys required for shipbuilding purposes.

January Steel Production.—Steel production in January reached a new record, the annual rate being 14,589,000 tons. It exceeded the previous best (October last) 14,316,000, the November and December rates being 14,174,000 tons and 12,646,000 tons respectively.

Tin Metal Allocations.—The Ministry of Supply announce the following interim allocations of tin metal (in long tons) by the Combined Tin Committee for the first half of 1948, additional to those announced on January 14: Norway 80 tons; Sweden 400; Iceland 10; Newfoundland 5; total 495 tons.

Anglers' Unite Against Pollution.—A statement from the newly-formed Anglers' Co-operative Association (chairman, Mr. John Eastwood, K.C.), says that the first and chief objective is the fight against pollution of rivers, for which purpose a proportion of all money received will be set aside.

Methyl Bromide Inquiry.—A rider to the effect that fire extinguishers containing methyl bromide or similar poisons should be marked "poison," was added to the verdict of a jury at Dundee on Monday at a public inquiry into the deaths of six boys. They were found in the sealed cabin of an R.A.F. launch in which a fire extinguisher had been discharged.

Foundry Workers Seek Higher Wages.—The rapid implementation of reforms in the foundry industry and an immediate wage increase of 30s. per week were urged at a delegate conference of the Amalgamated Union of Foundry Workers at Glasgow, when it was suggested that, failing these, there was danger of the foundry industry becoming undermanned.

More Chemical Workers.—Chemical industries in November last provided employment as follows (in thousands): Chemicals 194.5, coke ovens and by-products 14.1, explosives 14.4, paints and varnishes 30.8, oil, glue, soap, ink, etc., 84.4. The total, according to the current summary of the Ministry of Labour, was 358,200, compared with 347,800 in mid-1947. Chemical workers recorded as wholly unemployed on December 8 numbered 970.

Clay Workers' Decision.—By a 95 per cent majority vote, Cornwall clay workers have refused to work on Saturday afternoons following an earlier agreement to do so.

G.P.O. Rangoon Service Restored.—The insured letter box and parcel services to Rangoon have been restored. Detailed particulars may be obtained at any Post Office.

Sodium Metaphosphate Prices.—Albright & Wilson, Ltd., 49 Park Lane, London. W.1, announces that it has recently been compelled to increase the prices of Calgon (sodium metaphosphate). Flake Calgon, packed loose in metal drums, is £103 per ton.

Overseas Demand.—The Engineering Centre Ltd., in Glasgow continues to receive a very considerable volume of inquiries and requests from abroad. Among the equipment in greatest demand are ice-making units, refrigeration and dehydration units, and diesel equipment for a wide variety of purposes.

Merger Agreed.—General meetings of the Institution of Works Managers and of the Institution of Factory Managers have accepted a joint recommendation by the executive councils of the two bodies that they should merge into one organisation as from July 1 next.

Chemical Safety Conference?—*Safety News*, the official journal of the Royal Society for the Prevention of Accidents, states that tentative plans are in being for a conference dealing with safety in the chemical industry. The Society hopes the Association of British Chemical Manufacturers will co-operate.

Senior Employees' Pension Scheme.—In his annual review, Mr. Thomas H. Redfern, chairman and managing director of Redfern's Rubber Works, Ltd., said that in addition to the Employees' Pension Fund which was started in 1935 (providing for men and women earning £400 per year or less), the company had now initiated a similar scheme for managerial staff, for which £5000 had already been allocated.

Textile Prize Scheme.—The Midlands Section of the Textile Institute is organising a prize scheme to encourage the preparation and presentation of papers on textile subjects. Prizes of £5, £3 and £2 are being offered for 3000-word papers on subjects directly related to the textile industry. Entry forms and particulars are available from Mr. J. C. H. Hurd, 66 Kirklands Road, Leicester. Papers are to be submitted by March 17.

Next Week's Events

MONDAY, FEBRUARY 23

Royal Institute of Chemistry (London and S.E. Counties Section). Norwood Technical Institute, Knight's Hill, S.E.27, 7 p.m. Film display.

Institution of the Rubber Industry. Engineers' Club, Manchester, 6.15 p.m. L. A. Oliver: "Machinery and Layout in German Rubber Plants."

TUESDAY, FEBRUARY 24

Society of Chemical Industry, Chemical Society, and **Royal Institute of Chemistry** (Edinburgh and East Scotland Sections). Biochemistry Lecture Theatre, Teviot Place, University, Edinburgh. 7 p.m. Prof. W. F. K. Wynne-Jones: "Proton Transfer and Analogous Reactions."

Royal Institute of Chemistry (London and S.E. Counties Section).) The Cherry Tree, Welwyn Garden City, 8 p.m. D. H. Hey: "Reactions of Bennoyl Peroxide."

Hull Chemical & Engineering Society. Church Institute, Albion Street, Hull, 7.30 p.m. "Fire Equipment in Chemical Works."

Society of Instrument Technology. Lecture Theatre, Royal Society of Tropical Medicine and Hygiene, Manson House, Portland Place, W.1, 6.30 p.m. H. W. Thompson: "Infra-red Methods of Analysis and Control."

WEDNESDAY, FEBRUARY 25

Royal Institute of Chemistry (Dublin Section). Chemical Department, University College, Dublin, 7.30 p.m. J. L. Ginnell: "Industrial Efficiency in the Sugar Industry."

Society for Visiting Scientists. 5 Old Burlington Street, W.1, 7.30 p.m. Prof. A. A. Hall and Prof. C. H. Waddington: "Growing Points in Science."

North-Western Fuel Luncheon Club. Engineers' Club, Albert Square, Manchester, 12 noon. Sir Frederick J. West: "The Right Relationships in Industry."

THURSDAY, FEBRUARY 26

Society of Chemical Industry (Nottingham Section). Welbeck Hotel, Nottingham, 7.15 p.m. R. E. Bastick: "Recent Developments in Glass."

Royal Institute of Chemistry (Manchester and District Section). Engineers' Club, Albert Square, Manchester, 2, 7 p.m. J. H. Carrington: "Rubber."

Royal Statistical Society. (Industrial Applications Section—Sheffield Group). Royal Victoria Hotel, Sheffield, 6.30 p.m. Miss B. Pickersgill: "Graphical Methods for the Demonstration of Simple Statistical Relations."

FRIDAY, FEBRUARY 27

Society of Chemical Industry and Royal Institute of Chemistry. University College, Cathays Park, Cardiff, 7 p.m. D. Matheson "Duel Explosions in Factories." (Bristol and S.W. Counties Sections and Chemical Society). Washington Singer Laboratories, Prince of Wales Road, Exeter, 4.30 p.m. N. K. Adam: "Surface Films." (Aberdeen and N. Scotland Sections and Chemical Society). A. W. Johnson: "Applications of Acetylene Compounds in Organic Synthesis."

Royal Institute of Chemistry (Glasgow and W. Scotland Section). Royal Technical College, Glasgow, 7.15 p.m. Annual General Meeting. J. W. Cook: "Chemistry in Post-War Germany."

Chemical Society (Eire Section). Chemical Lecture Theatre, University College, Dublin, 5 p.m. C. K. Ingold: "Aromatic Nitration."

SATURDAY, FEBRUARY 28

Society of Chemical Industry, Chemical Society and **Royal Institute of Chemistry.** (Newcastle-upon-Tyne and Teesside Sections) Norton Hall, Stockton-on-Tees, 2.45 p.m. R. W. Whytlaw-Gray: "The Compressibilities of Gases at Low Pressures."

Royal Institute of Chemistry (London and S.E. Counties Section). Zoological Theatre, University, Reading, 3 p.m. Film display.

U.S.S.R. Petroleum

Quickening Recovery in 1947 Claimed

THE reconstruction and development of Russia's petroleum industry, after a slow start, has made considerable headway during 1947, states the *Petroleum Press Service*. This impression has been conveyed by recent Soviet Press reports as well as by the communiqué issued by the State Planning Commission on the execution of the current five-year plan, the second year of which has just been completed. It is reported that the targets set for the petroleum industry have been exceeded and that the plan may be fulfilled before the scheduled time. No absolute figures of the results attained have been published.

Crude oil output is stated to have increased by 19 per cent over the 1946 level and natural gas production to have gone up by 25 per cent. Since it is known that some 22,800,000 metric tons of crude oil were produced in the U.S.S.R. in 1946, last year's output must have aggregated over 27 million metric tons.

In view of the rapid growth in industrial and agricultural activity in the Soviet Union, this improved crude oil output has by no means been sufficient to meet the demand and it also seems that the exploration of yet untested areas and the development of newly discovered fields were inadequate.

Overseas News Items

Canadian Businessmen Visit Germany.—57 Canadian businessmen visited Germany in January. The same quota has been set for February.

Dutch Rayon Exports Up.—Netherlands rayon exports in 1947 were worth 65 million guilders, against only 25 million in 1946. Rayon exports to the United States are reported to have benefited from the fact that the American industry has not yet been able to expand its capacity at short notice.

Petroleum Monopoly in Rumania.—The Rumanian Government established on February 9 a State monopoly company for foreign trade in petroleum and its derivatives. This company will have the sole right to export and import crude oil, oil products, machinery, transport equipment and chemicals required in the oil industry.

Italian Metallurgists' Conference.—The second national meeting of the Associazione Italiana di Metallurgia (which had previously been postponed), will take place in Milan from April 23 to 25. "Corrosion," and "The Ageing of Metals," are the two papers to be discussed on the first day. The other days will be devoted to discussion.

Medical Supplies for China.—Mrs. V. E. Miller, general secretary of British United Aid to China, has announced that over 36 tons of medical supplies had been shipped to China by the fund during 1947. Among the goods were drugs, surgical equipment, microscopes, radio equipment, drilling machinery and medical supplies of all kinds. The total value of the shipments was £13,381. Goods worth £4600 still awaited shipment.

New U.S. Furnace in Operation.—Operation of a new 50-ton electric furnace has commenced at the Los Angeles plant of the Bethlehem Pacific Coast Steel Corporation. When in full production it will use 7500 tons of scrap, lime rock and ore, and more than five million kWh of electricity monthly. The completion of this installation marks a step in the $14 million expansion programme designed to double the capacity of the plant.

Formosa Rehabilitation.—One cyanamide and two superphosphate plants in Formosa have so far been rehabilitated, and production is said to be running at the annual rate of 30,000 metric tons. The island's requirements are estimated at about 400,000 tons. Preparations have been completed for the resumption of aluminium production by the Taiwan Aluminium Industrial Co., which has been set a target of 4000 tons of aluminium metal per annum.

U.S. "Heat Pump" Development.—A U.S. manufacturer has produced an electric "heat pump" designed to heat a seven-roomed building from top water. In winter it will boost the water temperature by compression, while a reverse action will cool the building in summer.

Petroleum Research Centre for U.S.S.R.—The Soviet Russian Academy of Sciences has recently established a petroleum research centre, of which Academician Sergey Kametkin has been appointed director. The improved exploitation of oil forms one of the subjects for study.

U.S. Rubber Control Resumed.—Owing to shortages of the general purpose synthetic rubber GR-S, of which supplies have been difficult to obtain since November last year, the U.S. Department of Commerce has resumed control of the distribution of all synthetic rubbers.

Vast New Plant for Goodrich.—The B. F. Goodrich Chemical Company is planning to erect a $3 million chemical plant at Avon Lake, near Cleveland, Ohio, construction to begin in the spring or early autumn of this year. The new unit will supplement production of rubbers, polyvinyl resins and organic chemicals.

Soviet Zone's Increased Chemicals.—The Leuna works are now the biggest industrial undertaking in the Soviet zone of Germany. Production last December is stated to have included 12,000 tons of ammonia and 32,000 tons of ammonium sulphate—a substantial increase compared with figures reported a few months earlier.

U.S. Government Patents for Industry.—A pamphlet listing 811 U.S. Government-owned patents, most of which are available for use by American interests on a royalty-free non-exclusive licensing basis, has been published by the Commissioner of Patents, Department of Commerce, Washington 25, D.C. The patents fall generally within eight classifications including chemicals, plastics, insecticides, and treatment of metals.

Lever Soap Factories for Africa.—A chain of seven soap factories planned by the Lever group for Africa, will extend from Boksburg in the Transvaal to Cairo. Other factories are to be erected in Kampala and Dar-es-Salaam (Uganda), and in West Africa. Work on the plant in the Transvaal is intended to commence this year, at an estimated cost of about £1 million. The Boksburg plant will also produce margarine and edible oils and fats.

German and Japanese Industrial Reports

THE latest reports on German and Japanese industry, now obtainable from H.M. Stationery Office at the prices indicated, include the following of interest to our readers.

BIOS 1010. Oil fields investigation. The war development of the German crude oil industry, 1939-1945. Part 1. North West German crude oil industry. Exploration (Reichsbohrungen and private) wells (20s.).

BIOS 1011. Oil fields investigation. The war development of the German crude oil industry, 1939-1945. Part II, Section 1. German oil industry. Exploration (15s.).

BIOS 1012. Oil fields investigation. The war development of the German crude oil industry, 1939-1945. Part II, Section 2. German oil industry. Exploration structures (30s.).

BIOS 1013. Oil fields investigation. The war development of the German crude oil Industry, 1939-1945. Part III, Section 1. German oil industry. Development and exploitation of oil fields (10s.).

BIOS 1014. Oil fields investigation. The war development of the German crude oil industry, 1939-1945. Part III, Section 2. German oil industry. Development and exploitation of oil fields (40s.).

BIOS 1015. Oil fields investigation. The war development of the German crude oil industry, 1939-1945. Part III, Section 3. German oil industry. Oil production statistics and analyses (5s.).

BIOS 1016. Oil fields investigation. The war development of the German crude oil industry, 1939-1945. Part IV, Section 1. The war structure of the German crude oil industry, 1934-1945 (20s.).

BIOS 1017. Oil fields investigation. The war development of the German crude oil industry, 1939-1945. Part IV, Section 2. The war structure of the German crude oil industry, 1934-1945. Private industry (15s.).

BIOS 1188. Preliminary survey of the German pump industry. Centrifugal, axial flow, self-priming, and reciprocating pumps, etc. (Part 3) (9s.).

BIOS 1651. Solvents and plasticisers in Germany. Plasticisers section (12s. 6d.).

BIOS 1652. Solvents and plasticisers in Germany. Solvents section (6s. 6d.).

BIOS 1662. Methyl chloride production at I.G. Farben, Hoechst (1s. 6d.).

BIOS 1664. German fibrous and scientific glass industry (2s. 6d.).

BIOS 1667. Some notes on German open hearth furnace design and operation (3s.).

FIAT 915. The manufacture of sulphonamides and related intermediates in the French, British and American zones of occupation, Germany (17s. 6d.).

FIAT 1152. Design practices and construction of centrifugal compressors by leading German manufacturers (3s. 6d.)

BIOS/JAP/PR/923. Japanese fuels and lubricants. Pine root oil programme.

BIOS 1474. Developments in cable manufacture (use of tungsten carbide dies) (1s. 6d.).

BIOS 1560. The production of synthetic fatty acids and their conversion into soaps and the properties of the products (5s. 6d.).

BIOS 1616. The winning and refining of potash minerals in the Western zones of Germany. Part III. Refining section. (17s. 6d.).

BIOS 1661. German organic pigments and lake dyestuffs (17s. 6d.).

BIOS 1665. Investigation of dry generator for acetylene type "Schammlos" (1s.).

FIAT 1181. Activated carbon production in Germany during the war (2s.).

BIOS/JAP/PR/1642. Study of the preparation of 2.3 butyleneglycol from glucose by fermentation (1s. 6d.).

BIOS Overall Report No. 1. Report on the petroleum and synthetic oil industry of Germany (S.O. Code No. 41-104) (10s.).

CIOS XXXIII—66. Visit to the Chemische und Physische Versuchs Anstelt of Kiel, evacuated to Danisch Nienhof. The use of concentrated hydrogen peroxide in naval weapons (3s. 6d.).

BIOS 1639. Manufacture of sulphuric acid. A.G. Des Altenbergs für Bergbau und Zinkhuetten-Betrieb, Essen-Bergeborbeck (1s. 6d.).

BIOS 1643. Manufacture of sulphuric acid. Die Dynamit A.G. Vormals A. Nobel & Co., Krummel Geesthacht (2s.).

FIAT 768. Phenol manufacture in Germany by the chlorination, sulphonation and Raschig processes (6s.).

FIAT 772. German powder metallurgy (10s.).

BIOS Misc. 22. Manufacture of stearyl amine (2s.).

BIOS misc. 23. Glycerogen—a substitute for glycerine (2s. 6d.).

BIOS Misc. 24. Synthetic glycerine (1s. 6d.).

BIOS/JAP/PR/1430. Nickel deposits in Japan (2s.).

BIOS/JAP/PR/1155. Japanese fuels and lubricants. Naval research on lubricants (40s.).

BIOS/JAP/PR/1313. Japanese fuels and lubricants. Naval research on aviation gasoline (40s.).

BIOS 1535. Report on investigation of methods of gaseous metal treatment (2s.).

BIOS 1615. The German metal finishing industry (20s.).

Study of Insecticides

Glasgow Tests of DDT and Gammexane

SUCCESSFUL experiments on disinfestation of housing property in Glasgow now completed by the Corporation Public Health Department, have confirmed the effectiveness of DDT Geigy and Gammexane. In particular, it has been proved that these preparations offer residual effectiveness for an extended period.

When tests, at the invitation of the Scientific Advisory Committee of the Department of Health for Scotland, began in November, 1946, the Corporation had already experimented with a variety of preparations some of which had proved useful. Most of them were pyrethrum type and experience showed they were lethal to most domestic pests, though they lacked residual effect. When DDT was made available in 1944/45, tests were carried out with American Service insecticides dusted internally on a wooden box containing bed bugs, which were later transferred alive to an observation dish where they subsequently died. Three separate batches of live specimens placed in the dish at intervals with the dead specimens, also died. Thereafter, the lethal value of the DDT derived from contact with the dead specimens, appeared to become less potent. This residual value was noted, and when the Scientific Advisory Committee invited co-operation on a practical test, the Department decided to adopt DDT. Gammexane was subsequently also adopted.

Although successful results were achieved with both preparations, Gammexane appeared to have a speedier action. Only long-term tests, however, will demonstrate whether one insecticide is more effective than the other.

Hand spraying methods were generally adopted, the preparations being made up as follows: DDT Geigy in a 5 per cent water emulsion, a 5 per cent kerosene solution or a 10 per cent dusting powder. Gammexane was used either as an 0.35 solution in kerosene or a 0.35 powder. Strengths below these proved unsatisfactory. At these strengths, although the preparations were otherwise safe in use, it was found necessary to protect food while spraying was in progress; 250 houses treated by hand spraying were declared to be 100 per cent clean after a year's routine re-inspection.

Experience in Glasgow has shown that operatives suffered no ill-effects from contact with the preparations; barrier creams and special overalls were used.

The average cost of the preparations used over the period of testing was in the region

(*Continued in next column*).

of 13s. 3d. per gallon, and total cost some £1 per infested house treated.

Other useful work has been undertaken in Glasgow in hospitals, public baths and other municipal properties. In some of the older buildings, the construction made direct contact difficult and DDT powder traps had to be laid. Even in these cases a remarkable degree of success was achieved

Indian N-F Metal Scarcity

Home Production Urged

THE non-ferrous metals industry in India was in a precarious state, for, if imports of virgin metals stopped, as in wartime, the whole industry would be endangered, said Mr. G. K. Khemka, presiding over the second annual general meeting of the Indian Non-Ferrous Metals Manufacturers' Association held in Bombay. He called for immediate steps to survey, prospect and produce important virgin metals and urged that while the development of mineral resources of the country would form part of a long-range plan, a start should be made by establishing modern refineries for refining scrap, ores and metals as was being done in the United Kingdom.

Since the outbreak of the war, said Mr. Khemka, the non-ferrous metals industry of India had made considerable progress and the country's imports now consisted more of virgin metals than of semi-finished products. India was already self-sufficient in alloys, rods, bars, etc., of copper, brass and other metals, while the proposed erection of new sheet mills would dispense with the need for importing sheets and strips. A serious problem was the phenomenal rise in the price of metals.

G.P.O. Contracts

The work of the GPO Contracts Department forms the subject this week of an announcement from the GPO's London H.Q. Among the many contracts placed each year, running into many million £ sterling, and often involving "long and arduous negotiations" are glass for telephone kiosks, and many thousands of telephone insulators. Though the Contracts Department has functioned only for six years, it is claimed, with some justification, that its life has been an eventful one. The war years, the period of reconstruction, and the intervening changeover have severely tested the resourcefulness of the young department, which has close affiliations with the chemical and metallurgical industries.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

OBRIG LABORATORIES (GREAT BRITAIN), LTD., London, W. (M., 21/2/48.) January 20, mortgage, to Bradford Permanent Building Society, securing £6000 and any re-advances of sums repaid; charged on 8 Wilton Crescent, Westminster.

Satisfaction

BROOME RUBBER PLANTATIONS LTD., Richmond, Surrey. (M.S., 21/2/48.) Satisfaction January 20, of trust deed registered December 10, 1935 (fully).

Company News

Boots Pure Drug Co., Ltd., has declared an interim ordinary dividend for the half-year ending March 31, 1948, of 10 per cent less tax.

The nominal capital of **Winso, Ltd.,** chemical manufacturers, etc., 324 Regent Street, London, W.1., has been increased beyond the registered capital of £100, by £4900, in £1 ordinary shares.

The name of **Mount Pleasant Laboratories, Ltd.,** chemicals, etc., Mount Pleasant, Alperton, Middlesex, has been changed to Polypharma Laboratories, Ltd., as from January 24, 1948.

New Companies Registered

Acovari (Chemicals), Ltd. (448,873).—Private company. Capital £100. Manufacturers of chemical substances according to certain formulae to form chemical compositions for sale as fireproof wood-preserving solutions, detergents, etc. Directors: A. A. S. Service; M. F. Green, and S. G. Green, 139 Marlow Road, Anerley, S.E.20.

Agricultural Aids, Ltd. (449,227).—Private company. Capital £2500. Chalk quarry proprietors, dealers in limestone, micro-millers, grinders of carbonate of lime, limestone and similar substances. Directors: L. A. E. Bourlay, and C. A. Salter. Reg. office: 119 Riverside Flats, Greyfriars Bridge, Shrewsbury.

Extenders, Ltd. (449,191). — Private company. Capital £100. Manufacturers and suppliers of chemicals, chemical and natural products, etc. Directors: A. Cowdy, and J. R. Amphlett. Reg. office: 6 Wine Office Court, Fleet Street, E.C.4.

Hortex Products, Ltd. (449,251).—Private company. Capital £100. Chemical manufacturers and merchants, etc. Directors: L. E. Ward and C. Jacobs. Reg. office: Westbourne Street, High Wycombe.

Lester Laboratories, Ltd. (449,485).—Private company. Capital £100. Manufacturers of chemicals, gases, drugs, medicines, etc. Solicitors: Buckeridge and Braune, 3/4 Clements Inn, W.C.2.

Nova Productions, Ltd. (449,316).—Private company. Capital £1,000. Manufacturers of chemicals, gases and disinfectants, dyes, pigments, plastics, oils, etc. Directors: R. Sells and B. Sells. Reg. office: Gordon House, Gordon Rise, Nottingham.

Organic Chemicals, Ltd. (449,266).—Private company. Capital £100. Manufacturing, research, dispensing and analytical chemists and druggists, etc. Directors: L. E. Ward and S. Noble. Reg. office: 123 Pall Mall, S.W.1.

Pest Eradication Co., Ltd. (448,792).—Private company. Capital £2500. Manufacturers of insecticides, fumigants, disinfectants, etc. Directors: D. A. Donleavy, and Dorothy Donleavy. Reg. office: 2 Clements Inn, Strand, W.C.2.

Pharmaceutical Products Norgine, Ltd. (449,148).—Private company. Capital £100. Manufacturers of chemicals, pharmaceutical and industrial preparations, etc. Solicitors: Herbert Oppenheimer & Co., E.C.2.

Chemical and Allied Stocks and Shares

STOCK market business has been on a reduced scale and caution has been the keynote, in view of the continued uncertainty as to the manner in which prices and profits will be controlled. There was approval in the City that the F.B.I. and kindred bodies have been called in by the Government for consultation, but it is realised that considerable uncertainty must prevail until after the Budget. Markets have been proceeding on the basis that there is now little scope for higher dividends. Hopes of better returns had been based on the fact that results due to be issued this year would in many instances be the first to benefit from the end of E.P.T.

Shares of chemical and kindred companies

have moved with the prevailing trend and were mostly lower on balance, although there was some recovery from lowest levels touched recently. The tendency was to favour shares of companies which in recent years have shown earnings well in excess of dividend payments, the assumption being that whatever the decision regarding dividend restrictions, these companies would have good prospects of maintaining their payments.

Imperial Chemical were 47s.. Monsanto fluctuated around 59s., Lever & Unilever eased to 52s. 1½d. and reflecting less hopefulness of a higher dividend, British Aluminium receded to 48s. 1½d. Glaxo Laboratories 10s. ordinary, which have been prominent among shares favoured on higher dividend hopes, came back to £18 at one time, but later rallied to £19¼. W. J. Bush is the latest chemical and allied company raising additional capital for expansion; preference shareholders will be offered three new £1 5 per cent cumulative preference shares for every £1 of preference capital now held. Existing price of the £1 ordinary shares is 87s. 6d. and that for the £5 preference shares £6. The latter preference shares are to be sub-divided into £1 shares.

There has been active business around 62s. 9d. in Fisons, and in other directions, B. Laporte were quoted at 92s. 6d. Reflecting the prevailing market tendency, British Glues & Chemicals 4s. ordinary have receded to 20s. 9d., but Borax Consolidated deferred at 52s. 6d. lost part of an earlier decline. In other directions, Imperial Smelting at 22s. also recovered part of a decline. Amalgamated Metal were 18s. 4½d., but Turner & Newall eased afresh to 79s. Tube Investments rallied slightly to £6¼. Iron and Steel shares generally attracted rather more attention following their recent reaction, United Steel being 28s. 7½d., Dorman Long 29s. 9d., Guest Keen 48s., and Stewarts & Lloyds 52s. 7½d. Elsewhere, British Plaster Board were slightly better at 23s. 10½d., with Associated Cement 68s., and Tunnel Cement 45s. 7½d.

The units of the Distillers Co. were 27s. 9d., Boots Drug at 56s. 6d. were firmer, Beechams deferred were 20s. 3d. and Sangers 33s. 6d. Courtaulds were 41s. 9d. and British Celanese 22s. 9d., movements generally being small in the textile and allied groups. Oil shares moved erratically and failed to hold all an earlier rally. Recent talk that the fall in commodity prices in the U.S. might lead to lower American crude oil prices is not considered seriously. Mounting world consumption of oil is drawing attention to the industry's good prospects, although it is expected that generally profits must be dealt with conservatively over the next few years to finance the big expansion plans many companies are contemplating. Shell were 78s. 9d. and Anglo-Iranian £8⅞.

British Chemical Prices

Market Reports

CONDITIONS throughout the industrial chemicals market remain very much the same as has been reported over the past few weeks. A firm price position is in evidence on all sections, and the undertone generally strong. A good volume of inquiry for new business has been reported, although buying orders are not always easy to place owing to the uncertainty of the forward supply position. Delivery specifications from the home consumers are being met with promptness, and the movement in the aggregate is fairly substantial. Bichromate and chlorate of soda are in good call, and there is a steady request for yellow prussiate, Glauber salt, acetate of soda, and sodium phosphate, which is now £2 per ton dearer for the dibasic. Formaldehyde is in good demand and there is a steady inquiry for acetone and arsenic. The demand for the coal-tar products continues to be in excess of offers, while any pitch or creosote oil which is surplus to home requirements finds a ready sale on the export market, mainly on the Continent.

MANCHESTER.—Chemical traders have reported a steady flow of delivery specifications in both light and heavy chemical products on the Manchester market during the past week, especially from the cotton textile and allied industries. The soda compounds generally, as well as the potash and ammonia products and a wide range of miscellaneous chemicals are finding a steady outlet, and many of them are also attracting attention on export account. Replacement buying from home users has been on a fair scale during the past few days. There is a steady movement of most of the leading fertiliser materials and a brisk demand for the general run of coal-tar products has also been reported. Values in all sections of the market keep very firm.

GLASGOW.—The Scottish chemical market has been quieter than of late during the past week, although output of all classes of chemicals has been fairly well absorbed. There has been no outstanding demand for any one material. The export market has also been quieter and there has been a diminution in the number of inquiries, although orders have been booked on the same scale as before. In general, the picture of demand and supply has not changed substantially.

Patent Processes in Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted may be obtained from the Patent Office, Southampton Buildings, London, W.C.2., at 1s. each.

Complete Specifications Open to Public Inspection

Manufacture of esters useful as plasticisers. — Oel-Und-Chemie-Werk, A.G. Jan. 23, 1945. 34490/1947.

Tertiary amines and method for obtaining the same. —Parke, Davis & Co. July 15, 1946. 17724/47.

Tertiary amines and methods for obtaining same.—Parke, Davis & Co. July 15, 1946. 17916/1947.

Process for hydrocarbon conversion.—Phillips Petroleum Co. Feb. 6, 1942. 22865/1944.

Process for the production of fertilisers.—Potasse & Engrais Chimiques. July 9, 1946. 16941/1947.

Electrolytic deposition of metals in the form of powder. —D. Primavesi. March 19, 1946. 34519/1947.

Purification or concentration of magnetic powders.—D. Primavesi. March 29, 1946. 34520/1947.

Production of sintered compacts from metal powders. —D. Primavesi. March 29, 1946. 34521/1947.

Production of sintered bodies from metal powders.—D. Primavesi. April 2, 1946. 34522/1947.

Production of metal parts and semi-finished metal products.—D. Primavesi. April 10, 1946. 34523/1947.

Production of compact sintered bodies by pressing and sintered metal powders.—D. Primavesi. May 10, 1946. 34524/1947.

Production of sintered steel.—D. Primavesi. May 10, 1946. 34525/1947.

Production of pseudo-alloys.—D. Primavesi. May 10, 1946. 34526/1947.

Manufacture of ferro-magnetic metal powder.—D. Primavesi. May 13, 1946. 34527/1947.

Manufacture of iron antimony alloys.—D. Primavesi. May 15, 1946. 34528/1947.

Fixing parts inserted in sintered bodies.—D. Primavesi. May 16, 1946. 34529/1947.

Manufacture of homogenous powders and powder mixtures for powder-metallurgical purposes.—D. Primavesi. May 17, 1946. 34530/1947.

Manufacture of sintered bronze.—D. Primavesi. May 22, 1946. 34531/1947.

Manufacture of a material with high strength at elevated temperatures.—D. Primavesi. May 22, 1946. 34532/1947.

Process for the manufacture of plastic materials.—Produits Chimiques de Ribecourt. July 16, 1946. 18994-95/1947.

Process for the preparation of diaminotriazines.—Produits Chimiques de Ribecourt. July 16, 1946. 18996/1947.

2-tertiaryamino pyrimidines and processes for preparing them.—Pyridium Corporation. June 26, 1946. 29934/1946.

Method for production of brown and yellow dyestuffs through the treatment of semi-carbonised vegetable material with nitric acid.—O. E. Ramuz. June 10, 1946. 33781/1947.

Process for the manufacture of pyridyl-3-carbinol.—Roche Products Ltd. June 4, 1946. 11885/1947.

Piperidine derivatives.—Roche Products Ltd. July 8, 1946. 17997-99/1947.

Process for the manufacture of new acid dyestuffs of the anthraquinone series.—Sandoz, Ltd. July 5, 1946. 17608-10/1947.

Process for the manufacture of new acid dyestuffs of the anthraquinone series.—Sandoz, Ltd. July 5, 1946. 17611-14/1947.

Dialkylaminoalkyl ethers of certain polynuclear compounds.—G. D. Searle & Co. Oct. 7, 1943. 32984/1947.

Process and apparatus for the separation of hydrochloric acid from its aqueous solutions.—Soc. Anon. des Manufactures des Glaces et Produits Chimiques de Saint-Gobain, Chauny & Cirey. July 12, 1946. 16678/1947.

Process for the manufacture of fertilisers.—Soc. Anon. des Manufactures des Glaces et Produits Chimiques de Saint-Gobain, Chauny & Cirey. Oct. 17, 1945. 34483/1947.

Method of producing higher molecular alcohols.—Soc. Anon. D'Innovations Chimiques "Sinnova" ou "Sadic." June 28, 1946. 8147/1947.

Process for synthesising vinyl esters of carboxylic acids.—Soc. Belge de L'Azote et des Produits Chimiques du Marly. March 21, 1944. 33805/1947.

Production of ketene and derivatives thereof.—Soc. Rhodiaceta. July 16, 1946. 17904-5/1947.

Manufacture of artificial resins.—Spolek Pro Chemickon a Hutni Vyrobu, Narodni Podnik. July 2, 1943. 34401/1947.

Manufacture of alicyclic oxygen derivatives.—Standard Oil Development Co. June 27, 1946. 10012/1947.

Process for the synthesis of hydocarbons.—Standard Oil Development Co. July 12, 1946. 13596/1947.

Melting, re-melting and recovering of aluminium and its alloys.—V. Sterental. Dec. 12, 1942. 34216/1947.

Holding and ladling furnace for molten metals and process for purifying said metals during their transfer and holding.—V. Sterental. Dec. 12, 1942. 34218/1947.

Separation of columbium and tantalum from ores.—Titan Co., Aktieselskab. May 19, 1941. 34272/1947.

Process for production of synthetic or natural vulcanised rubber containing titanium dioxide.—United Chemical & Metallurgical Works. July 1, 1941. 34494/1947.

Process for the production of cellulose rayon threads. —United Chemical & Metallurgical Works. Dec. 20, 1944. 34495/1947.

Chlorine concentration limit indicator.—Wallace & Tiernan Products, Inc. July 13, 1946. 16644/1947.

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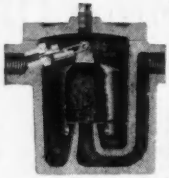

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